User's manual

Eos

X Terminal

DOC-3061-2, Current version

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chapter 7	add.	
chapter 8		
chapter 9		

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corr.: Passages of the corresponding chapter were corrected; see modification bars.
add.: Passages of the corresponding chapter were added; see modification bars.

This manual refers to following hardware and software configurations of Eos X Terminal:

Release X Server	R3.48

Document history

Modifications, which result in a new version, are indicated by a vertical bar.

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Revision sheet

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Please correct the following points in this documentation (**DOC-3061-2**):

page	wrong	correct

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1 Introduction

This chapter explains the structure of the manual itself and the used typographic styles and symbols. Safety information is provided concerning the operation of computer systems from Barco.

1.1 How this manual is organized

This manual describes design and startup of Eos from Barco. It is divided into nine chapters:

- **Introduction**
  explains the structure of the manual itself and the used typographic styles and symbols. Safety information is provided concerning the operation of computer systems from Barco.
- **Summary**
  gives an overview about the features of Eos.
- **Getting Started**
  describes the set up of Eos and provides you with a guide through the software configuration. If your Eos is already configured within your working place you can skip this chapter and continue with chapter 4 Operating.
- **Operating**
  shows the capabilities which Eos offers displaying graphics and video. You are introduced into operating the X video client for displaying video and RGB signals and the REMOTE-CONTROL client for controlling an OVERVIEW display wall.
- **Maintenance**
  describes the maintenance of Eos.
- **Advanced Configuration**
  may provide useful information for reconfiguring the software and hardware of your Eos.
- **Technical Appendix**
  gives tabular overviews about the technical details of Eos, its components and of their interfaces.
- **Troubleshooting**
  gives advice, if your Eos does not operate properly.
- **Index**
  lists the keywords of the manual.

Chapters, pages, figures and tables are numbered separately. Chapters are indicated by a »point syntax«, e. g. **4.2.3**, pages by a »dash syntax«, e. g. **2-1**, as figures and tables are, e. g. **figure 5-4**.

1.2 Styles and symbols

The typographic styles and the symbols used in this document have the following meaning:

Bold	Labels, menus and buttons are printed in **Bold** font.
Condensed	Links to both other chapters of this manual and to sites in the Internet are printed condensed. In the on-line version of this manual all hyperlinks appear teal.
`Courier`	Names of files and parts from programs are printed in the `Courier` font.
`Courier bold`	Inputs you are supposed to do from the keyboard are printed in **`Courier bold`** font.

↳	**Within a piece of programming code this arrow marks a line, that must be made up in two lines, though meant to be one line.**
	If you do not heed instructions indicated by this symbol there is a risk of damage to the equipment!
	If you do not heed instructions indicated by this symbol there is a risk of electrical shock and danger to personal health!
	If you do not heed instructions indicated by this symbol there is a risk of damage to parts, which are sensitive towared electrostatic charge!
	If you do not heed instructions indicated by this symbol there is a risk to get harmed by sharp objects!
	If you do not heed instructions indicated by this symbol there is a risk that parts may explode!
	If you do not heed instructions indicated by this symbol there is a risk that hot parts impact persons or objects!
	This symbol marks passages concerning solely the distributed system.
	The sheet icon indicates additional notes.
	Next to this icon you find further information.
	This arrow marks tips.
	Next to this icon you find important notes.

1.3 Safety instructions

This section describes safety precautions, which must be observed when installing and operating a product from Barco.

1.3.1 Standards

Safety regulations

Eos is built in accordance with the requirements of the international safety standard EN60950, UL1950 and CSA C22.2 No. 950, which are the safety standards of information technology equipment including electrical business equipment.

These safety standards impose important requirements on the use of safety critical components, materials and isolation, in order to protect the user or operator against the risk of electric shock and energy hazard, and having access to live parts.

Safety standards also impose requirements to the internal and external temperature variations, radiation levels, mechanical stability and strength, enclosure construction and protection against risk of fire.

Simulated single fault condition testing ensures the safety of the equipment to the user even when the equipment's normal operation fails.

Electromagnetic interference

Electromagnetic emission of Eos complies with EN55022, EN61000-3-2, EN61000-3-3 and the limits for a class B digital device, pursuant to Part 15 of the FCC Rules.

Electromagnetic immunity of Eos complies with EN55024.

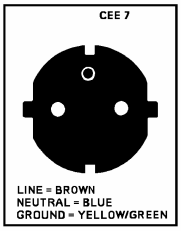
1.3.2 Precautions

For your own protection, observe the following safety precautions when installing, operating and servicing your device:

- Before operating the units please read this manual thoroughly and retain it for future reference!
- Observe all warnings and instructions printed on the devices!
- Servicing not explicitly mentioned in this manual should never be carried out by unauthorized personnel! Never open the case of the unit without first disconnecting the power supply cord!
- To prevent fire or electrical shock hazard, do not expose this unit to rain or moisture!
- This product should be operated from an AC power source!
- This unit may be connected to an IT power system!
- Check that the voltage and frequency of your power supply match those printed on the device label with the rated electrical values!
- If you are not sure of the type of AC power available, consult your dealer or local power company!
- This product is equipped with a 3-wire grounding plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug!
- This equipment must be grounded (earthen) via the supplied 3 conductor AC power cable. (If the supplied power cable is not the correct on, consult your dealer.)

Mains lead (AC power cord) with CEE 7 plug:

The wires of the mains lead are colored in accordance with the following code:

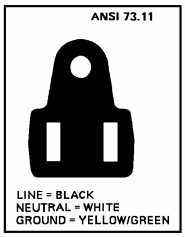


yellow + green	Earth (Ground)
blue	Neutral
brown	Line (Life)

Figure 1-1
CEE 7 plug

Power cord with ANSI 73.11 plug:

The wires of the power cord are colored in accordance with the following code.



yellow + green	Earth (Ground)
white	Neutral
black	Line (Life)

Figure 1-2
ANSI 73.11 plug

- Do not allow anything to rest on the power cord. Do not locate this product where people will walk on the cord. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- If an extension cord is used with this product, make sure that the total of the ampere ratings on the products plugged into the extension cord does not exceed the extension cord ampere rating.
- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock.
- Never spill liquid of any kind on the product. Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Lightning - For extra protection for this video product during a lightning storm or when it is lift unattended and unused for a long period of time, unplug it from the wall outlet. This will prevent damage to the unit due to lightning and AC power-line surges.

1.3.3 Unpacking of devices

Note advises on the packaging for unpacking!

1.3.4 Installation

- Do not place this unit on an unstable cart, stand, or table. The unit may fall, causing serious damage to it.
- Do not use this unit near water.
- Use only the power cord supplied with your unit. While appearing to be similar, other power cords have not been safety tested at the factory and may not be used to power the unit. For a replacement power cord, contact your dealer.
- Slots and openings in the cabinet and the sides are provided for ventilation; to ensure reliable operation of the unit and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This unit should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- The maximum recommended ambient temperature for this equipment is 40° C.
- When using the unit in a multi-unit rack assembly or closed assembly the ambient temperature inside the assembly may not succeed the maximum rated ambient temperature.
- When installed in a rack, the installation should be such that the amount of air flow required for safe operation of the equipment is not compromised. The mounting of the equipment should be such that no hazardous condition is achieved due to uneven mechanical loading.

1.3.5 Servicing

Mechanical or electrical modifications others than described in this manual must not be made to the devices. Barco is not liable for damages resulting from modified devices.

Only authorized personnel should carry out other maintenance work not explicitly mentioned in this installation manual!

Never open the case of Eos without first disconnecting all power supply cords! Measurements and tests with the opened device may be carried out only in the factory or by specially trained personnel, due to the dangers of electrical shock.

1.3.6 Cleaning

Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. See section 5.3 Cleaning for a cleaning instruction!

1.3.7 Re-packing

Keep the original shipping carton and packing material; they will come in handy if you ever have to ship your unit. For maximum protection, repack your set as it was originally packed at the factory.

1.4 Online manual

On the documentation CD **OVT-2686-7** this manual **DOC-3061-2** can also be found in electronic form. Insert the CD in the CD ROM drive to view the manual. If autorun is enabled on the computer the start page of the CD comes up automatically.

On a Linux computer you might first need to mount the CD by using the following command

```
mount /dev/cdrom /mnt/cdrom
```

and then to open the start page **index.html** of the CD manually.

On this start page you will find a link to the user's manual of **Eos X Terminal**.

Acrobat Reader can be used to view the file. Adobe® Acrobat® Reader is free and freely distributable software that lets you view and print Adobe Portable Document Format (PDF) files.

If Acrobat Reader is already installed, the manual can be viewed just by a click on the respective link. Else the Acrobat Reader must be installed first. The required installation files can also be found on the CD.

2 Summary

This chapter gives an overview about the features of Eos X Terminal.

2.1 Properties

Eos was designed to control large, modular OverView display walls. Its multi-screen capability allows you to control displays of nearly any size and layout. The display area is one logically connected display. It is able to digitally control monitors based on modern technologies such as Single LCD, DLP™ and Poly-Silicon LCD with the highest display quality. High contrast and absolute immunity to electromagnetic interference distinguishes this type of control. CRT monitors and projectors can also be controlled by Eos using the optional analog output.

(DLP is a trademark of Texas Instruments Incorporated)

The hardware and software of Eos is based on world-wide accepted standards, so that the investment is protected. Eos offers the following exceptional capabilities:

- High performance graphics output using the most modern processor and chip technologies
- Supports current LAN and WAN interfaces
- Graphic and video outputs in high color quality
- Video in a window, up and down scaleable
- Overlapping and freely moveable video and graphics windows of unlimited size

The Eos system provides a flexible and scalable architecture, which is suitable to support all sizes of display walls. Small systems up to 10 projection cubes can be set up with one Eos Compact. For medium and large sized display walls Eos Compact with one or more Eos Extenders or the distributed system Eos Power can be used. Applications that require the video and RGB insertion unit Visu^{Plus} can be controlled with Eos Ultra and the wall management software Osiris. Eos Ultra consists either of a single Eos or a distributed system.

Whether Eos Compact, Eos Power or Eos Ultra both the user and the application software 'see' one single display. Installation, operation and service do not differ from that of a standard X terminal.

Eos offers the possibility to operate it in normal boot mode or in eXtended safety boot mode. Normal boot mode offers full write access to the hard disk. eXtended safety boot mode offers in addition to normal boot mode a backup partition for improved system safety. System files are stored safely, and faultless startup is guaranteed even after unpredictable events, e.g. power failure.

Eos Compact

Up to 12 projection cubes can be controlled by a single EOS COMPACT.

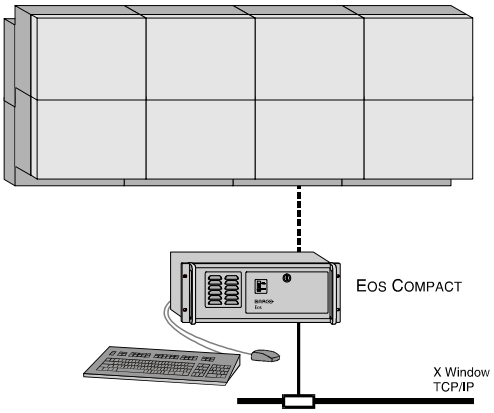


Figure 2-1
8 channel Eos

Eos Extender

An EOS EXTENDER increases the capacity of EOS for graphic channels and video and RGB insertion. An X Window Desktop with multiple video and RGB sources can such be displayed on 12 projection modules.

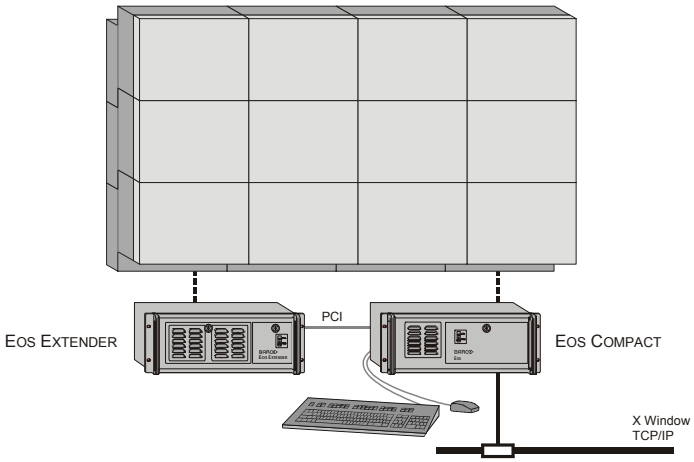


Figure 2-2
EOS COMPACT with EOS EXTENDER

Eos Power

The distributed system Eos Power consists of one Eos central device, connected to several Eos rendering machines, which control the projection modules.

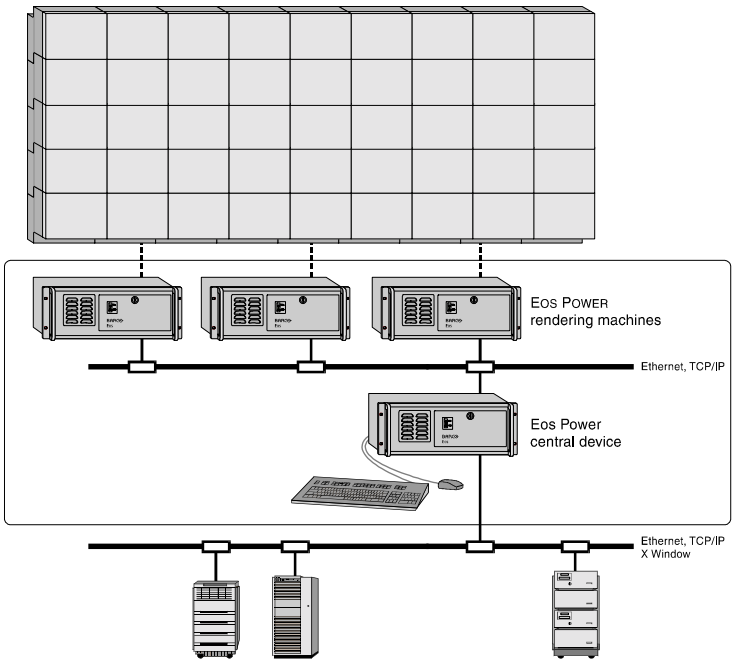


Figure 2-3
Eos Power

Eos Ultra

To the Eos Ultra system belongs depending on the wall size either a single Eos or a distributed system with rendering machines. The Visu^{Plus} units are connected to Eos and insert the video and RGB sources in the defined windows. To control the Visu^{Plus} units, the software Osiris has to be installed on Eos and Visu^{Plus}.

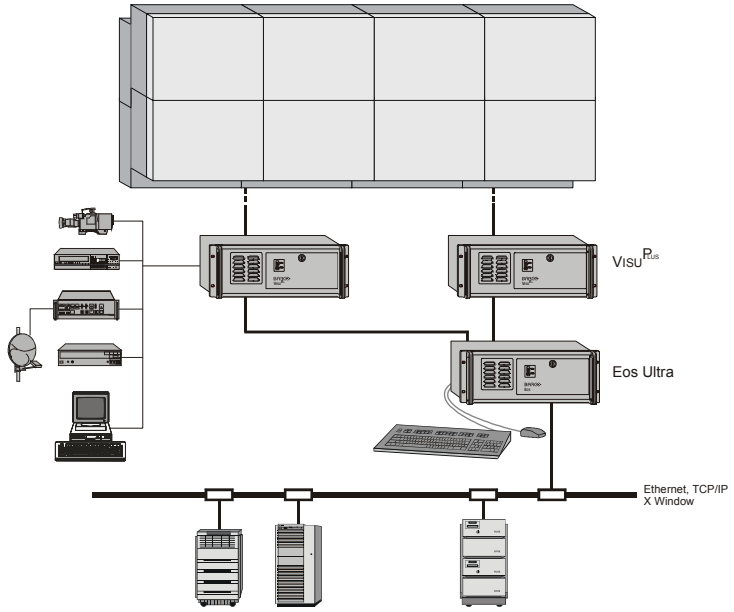


Figure 2-4
Eos Ultra

3 Getting started

This chapter describes the set up of Eos and provides you with a guide through the software configuration. If your Eos is already configured within your working place you can skip this chapter and continue with chapter 4 Operating.

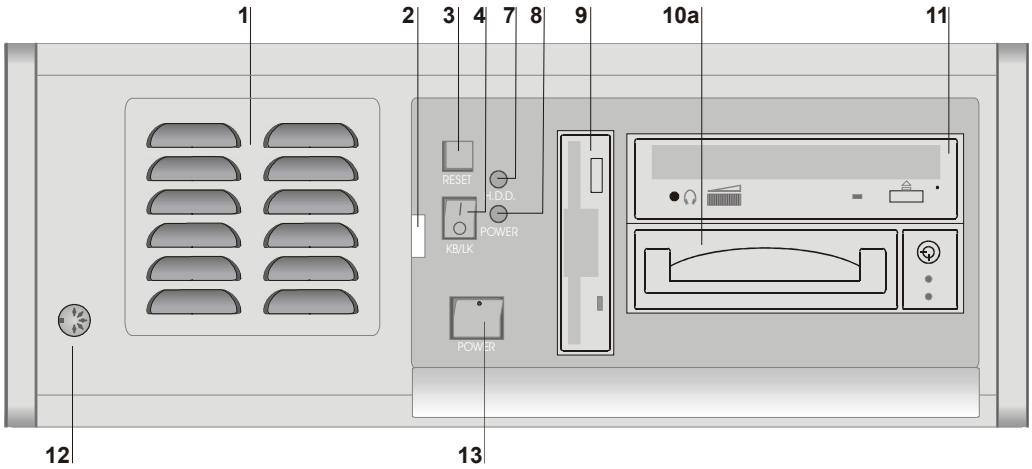
3.1 Examining

3.1.1 Eos

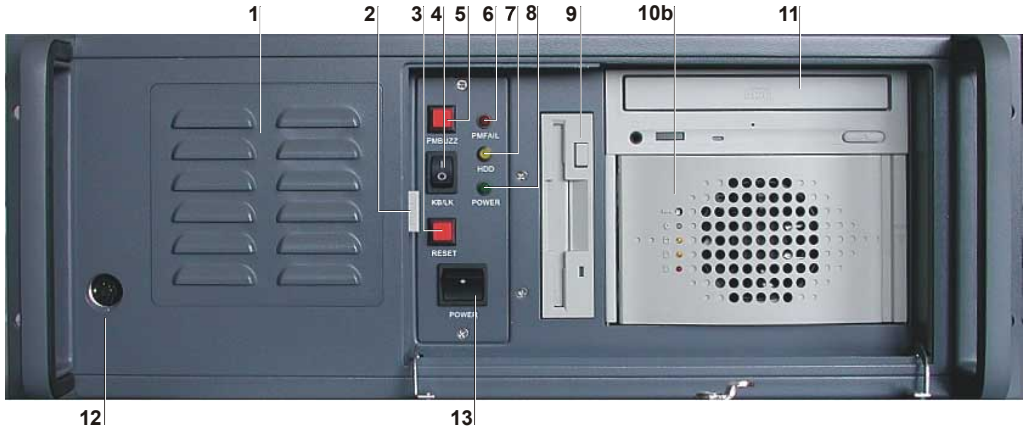
The case of Eos is available in two models: The standard case and the case for redundant power supply and RAID (Redundant Array of Independent Disks).

The front

Eos standard:



Eos with redundancy options:



1	air supply
2	handle of filter mounting
3	restart button
4	lock keyboard switch *(without functionality from model models EOS-3026-5 and EOS-3327-2 on)*
5	buzzer reset button: power module failed
6	LED: power module failed
7	LED: hard disk access
8	LED: power on
9	floppy disk drive
10a/b	hard disk drive / RAID subsystem
11	CD ROM drive
12	(reserved)
13	power button

Figure 3-1
front view of Eos

Next to the air supply openings [1] there is the handle of the filter mounting [2].

In the center of the standard case there are three buttons. The upper one is the **restart** button [3], the one in the middle is the **lock keyboard switch** [4], that serves to enable or disable keyboard input and the lower one is the **power** button [13]. The two LEDs next to the switches indicate **hard disk drive operating** [7] respectively **power on** [8].

The case for redundant operation additionally has a **buzzer reset button** for power module failure [5], which is located on the top leftmost position. The **restart button** [3] is located between the **lock keyboard switch** [4] and the **power button** [13] instead. On the front there is also an additional LED, indicating **power module failure** [6], please refer also to section 5.1.1 Redundant power module.

On the right hand side there is the floppy disk driver [9], followed by the CD ROM drive [11] and below it the hard disk drive [10a] or [10b].

The RAID hard disk drive system [10b] is available for RAID 1 (as shown in Figure 3-1 front view of Eos) or for RAID 5, please see the figure below.

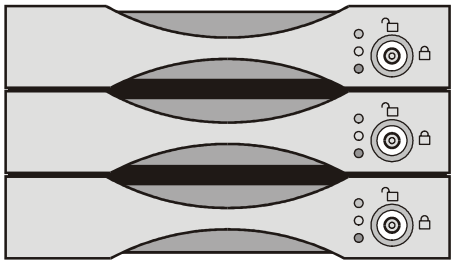


Figure 3-2
RAID 5 hard disk drivers

Each RAID 5 hard disk provides three LED's at the front of the removable frame. If the red LED lightens, this indicates that this particular hard disk has failed and should be replaced.

Please note for RAID 5 systems:

Never remove more than one hard disk while the system is running. Otherwise the system will crash and not be able to restore!

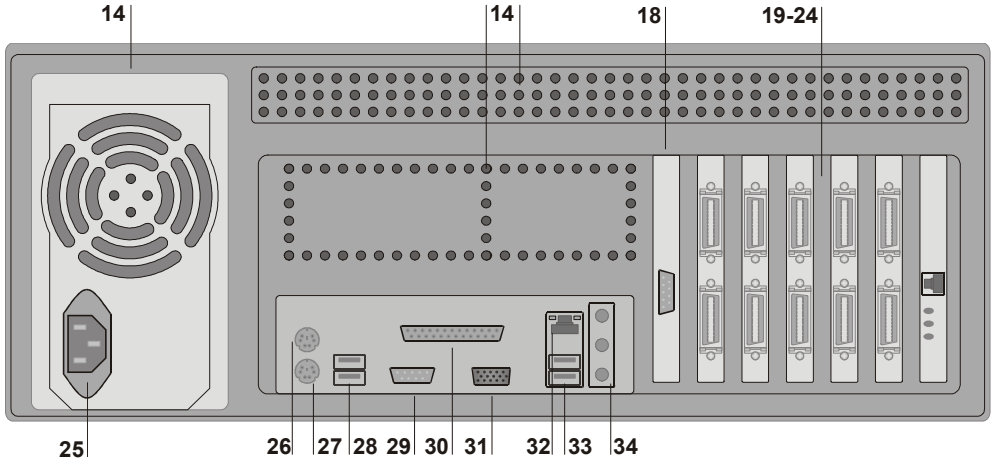
A hard disk is already switched off by turning the frame lock key!

Never change the sequential order of the hard disks. Otherwise the complete data on the drives will get corrupt and not be able to restore!

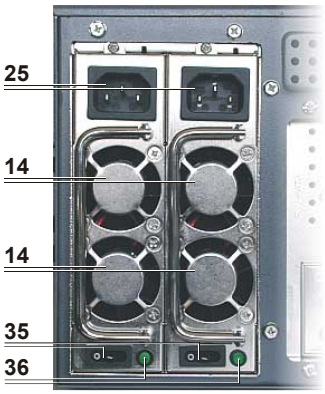
The rendering machines of the distributed system are assembled accordingly. They are delivered without CD-ROM drive and hard disk drive.

The back

Eos standard:



Left side of Eos with redundant power supply:



14	air supply		
18	(reserved)		
19-24	network cards, link interface card and other PCI cards		
25	mains connection		
26	PS/2 mouse (green jack)		
27	PS/2 keyboard (purple jack)		
28	USB3, USB4 (if position 33 is not available USB1, USB2)		
29	COM1		
30	LPT1		
31	onboard VGA adapter (models EOS-3026-5, EOS-3327-2/-3) or COM2 (models EOS-3026-4 and earlier, EOS-3327-1 and earlier)		
32	onboard LAN adapter *from model AGS-3328-2 on with the following LED signals:*		
	left LED	lightens green	a connection exists
		blinking green	activity
	right LED	off	10 Mbps connection
		lightens green	100 Mbps connection
		lightens yellow	1000 Mbps connection
33	USB1, USB2 (optional)		
34	audio, micro (optional)		
35	power switch of individual power module		
36	LED: individual power module operating		

Figure3-3
rear view of Eos

On the left hand side is the **mains connection** [25]. At the case of the Eos for redundant operation there is for both of the two power modules a **mains connection** [25] and additionally a **power switch** [35] and an **LED** [36], indicating operation of the power module, if lightened. In the middle of the power modules there is the air supply [14].

COM1 [29] is for plugging in a serial mouse or **PS/2 mouse** [26] is for plugging in a PS/2 mouse and **PS/2 keyboard** [27] is for plugging in a PS/2 keyboard. If available with network adapter [32] the network connection can be established.

On the right hand side there are different cards [19-24] inserted depending on the actual hardware configuration of your Eos.

To protect Eos from overheating, the air supply openings in the case shall be kept free of obstructions!

To disconnect Eos from the power supply all power cords have to be pulled of the mains connection [25]. Therefore the back panel has to be easily accessible!

The expansion slots

Depending on the model of Eos, it provides different expansion slot resources. In the models **EOS-3026-5**, **EOS-3327-2** and **EOS-3327-3** all six expansion slots are PCI slots. The following numbering exists:

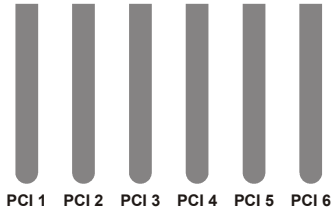


Figure 3-4
numbering of PCI slots on the back panel of EOS-3026-5, EOS-3327-2/-3

Also in the models **EOS-3327-1**, **EOS-3327-0**, **EOS-3026-4**, **EOS-3026-3**, **EOS-3026-2**, **EOS-3026-1** and **EOS-3026-03** there are six PCI expansion slots. They have the following numbering:

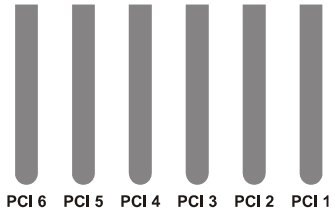


Figure 3-5
numbering of PCI slots on the back panel of EOS-3026-4/3/2/1/03

On the mainboard of **EOS-3026-01** and **EOS-3026-02** five expansion slots are PCI slots, one expansion slot is shared (PCI slot or ISA slot). Therefore the following possibilities exist:

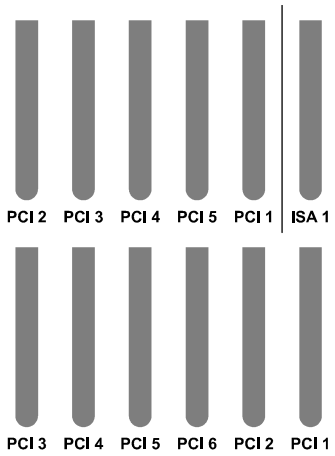


Figure 3-6
numbering of PCI and ISA slots on the back panel of EOS-3026-01 and EOS-3026-02

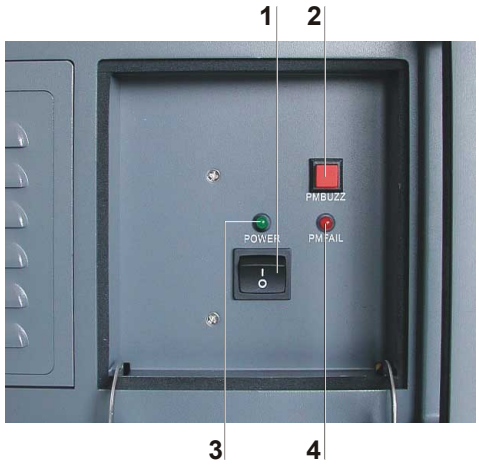
In the following sections reference is taken to the numbering of the slots.

3.1.2 Eos Extender

Eos offers five or six PCI slots. These slots are used by expansion cards of Barco (e. g., graphic cards, OmniScalers, video and RGB input cards). When connecting to larger display walls and displaying several videos simultaneously the number of slots in Eos may not be big enough. The Eos Extender extends Eos by adding 13 PCI slots. Thus a bigger number of projection cubes or more input sources can be connected. It is available with a standard power supply or a redundant hot plug power supply.

Front – Eos Extender 13 slots

The Eos Extender looks like this or similar:

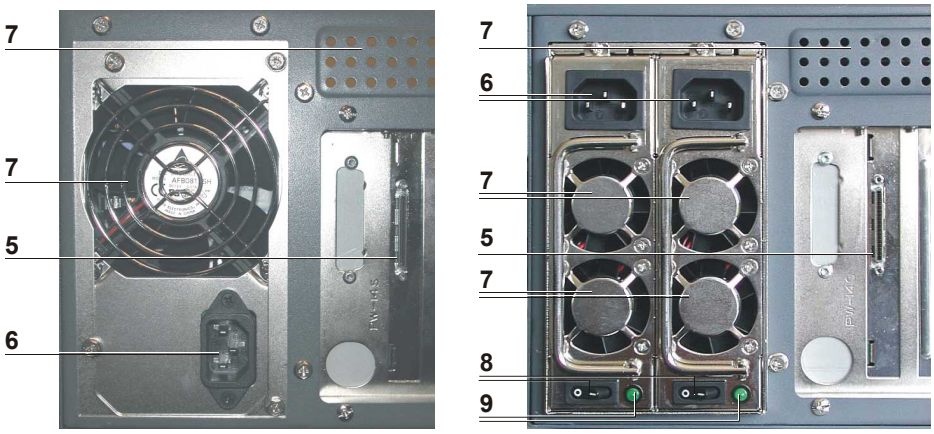


1	On/Off-switch
2	buzzer reset button: power module failed (only used with redundant power supply)
3	LED: power on
4	LED: power module failed (only used with redundant power supply)

Figure 3-7
Front of the Eos Extender

On the front of the Eos Extender behind the lockable flap on the lowest position, there is the **On/Off**-switch [1]. On the top position is a **buzzer reset button** [2] for power module failure of a redundant power module. Between these two buttons there are two LED's, the green LED **power on** [3] to the left is indicating if power is on. The red LED **power module failed** [4] to the right indicates that a redundant power module is not operable, please refer to section 5.1.1 Redundant power module.

Back – Eos Extender 13 slots



5	Connector for connecting cable to Eos
6	mains connection
7	air supply
8	power switch of individual power module
9	LED: individual power module operating

Figure 3-8
Sockets on the back of the Eos Extender standard (left) and with redundant power supply (right)

On the back of the Eos Extender, there is the **mains connection** [6]. To the right there is the **connector for the connecting cable** to Eos [5]. The Eos Extender with redundant power supply in addition has individual **power switches** [8] on each module and **green LEDs** [9] that indicate that the power module is operating.

The expansion slots

Depending on the model of the Eos EXTENDER, it provides either 7 or 13 PCI slots in either 1 or two PCI segments.

The models Eos EXTENDER (**Eos-3193-0/1**) and the PCI EXTENDER BOX (**MMT-2789-02**) each with 13 slots provides them in two segments:

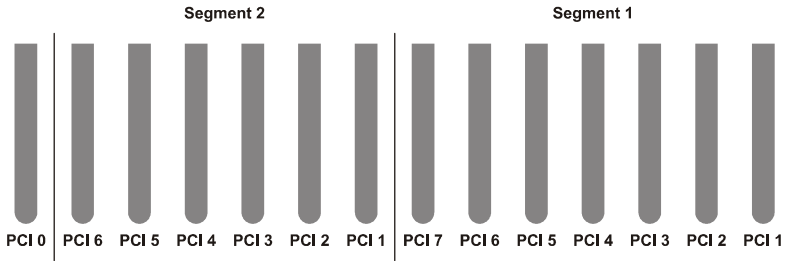


Figure 3-9
PCI Slots and Segments

The model PCI EXTENDER BOX (**MMT-2788-1**) with 7 slots has a single segment:

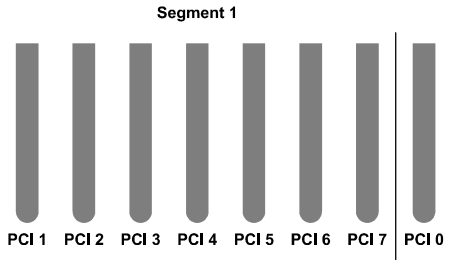


Figure 3-10
PCI Slots and Segments

Connector **PCI 0** is reserved for the connection to Eos.

In the following sections reference is taken to the numbering of the slots.

3.2 Cabling

3.2.1 Power supply

Check the power rating on your outlet before connecting Eos to the wall outlet or to a power strip. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

Eos is designed to operate with single-phase power systems having a grounded neutral conductor. To reduce the risk of electrical shock, do not plug into any other type of power system.

To connect Eos to the power supply, follow these steps:

- Plug the female end of the power cords into the mains connections [25].

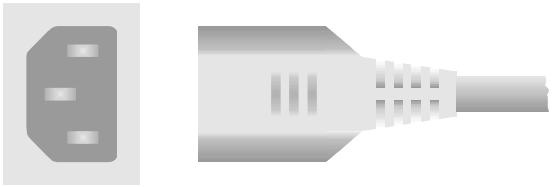


Figure 3-11
Mains connection of Eos

- Plug the male end of each power cord into a power outlet.

3.2.2 Mouse

The standard mouse is either a serial mechanical mouse or a PS/2 mechanical mouse.

Serial mouse

Plug a serial mouse into the **COM1** jack [29] and screw in the strain relief screws.

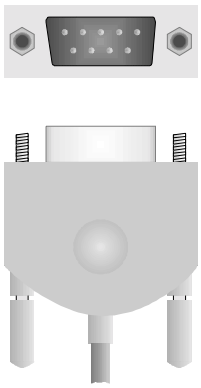


Figure 3-12
COM1 port

PS/2 mouse

Plug a PS/2 mouse into the **PS/2 mouse** jack [26].

Figure 3-13
PS/2 mouse jack

3.2.3 Keyboard

The standard keyboard is a MF-II type keyboard with a PS/2 connector. Plug it into the **PS/2 keyboard** jack [27].

Figure 3-14
PS/2 keyboard jack

3.2.4 Keyboard extension

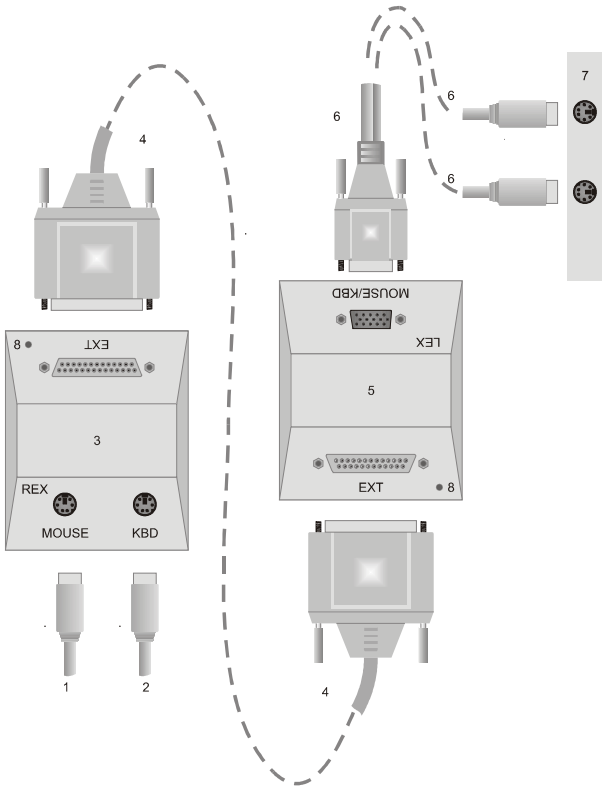
The keyboard extension allows a distant positioning of keyboard and mouse. Depending on the type of the mouse it is available in two versions, either for the connection of a PS/2 mouse (**TAS-2747-1**) or a serial mouse (**TAS-2747-0**). The figure on the following page shows schematically the parts and the cabling of the keyboard extension.

The keyboard extension is made up of two extension boxes (**remote extension box REX** [3], **local extension box LEX** [5]) and two connection cables **(connection cable 20m** [4], **PC cable** [6]). Keyboard and mouse are plugged into the **remote extension box** instead of being plugged directly into Eos. The **remote extension box** is connected to the **local extension box** with the **connection cable 20m**.

The **local extension box** is connected to the **PS/2 keyboard** and **mouse** port (either **PS/2** or **serial** depending on the type of mouse and keyboard extension) of Eos with the **PC cable**, which has on the one end a single plug, but on the other end two plugs.

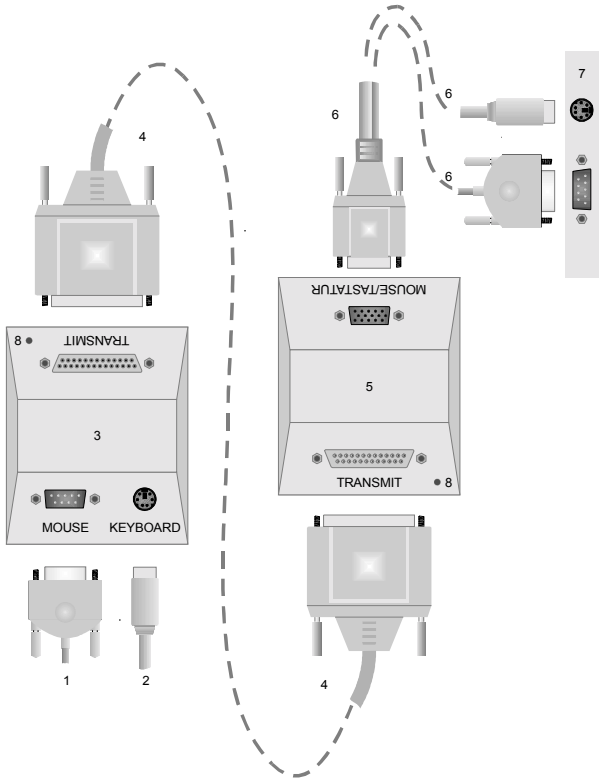
The two interface boxes are prepared for grounding. On each side labeled **EXT** and **TRANSMIT** respectively there is a thread for fixing a ring connector size 3.

TAS-2747-1 for PS/2 keyboard and PS/2 mouse



1	mouse	
2	keyboard	
3	remote extension box	TAS-3196
4	connection cable 20m	TAS-2710
5	local extension box	TAS-3195
6	PC cable	TAS-3201
7	Eos	
8	grounding	

TAS-2747-0 for PS/2 keyboard and RS-232 serial mouse



1	mouse	
2	keyboard	
3	interface box keyboard	TAS-2707
4	connection cable 20m	TAS-2710
5	interface box PC	TAS-2706
6	PC cable	TAS-2711
7	Eos	
8	grounding	

Figure 3-15
keyboard extension

3.2.5 Graphic cards

The DDC capable UGX and AGX GRAPHIC CARDS provide the facility for connecting CRT monitors or projectors (analog mode) or for connecting Barco projection modules (digital mode) to an EOS. By means of a rotary switch on the board they can easily be switched between analog and digital mode.

For EOS systems with digital output and video or RGB insertions the output of the graphic cards is led over to OMNISCALERS and then connected to the display device. Please refer to section 3.2.6 OmniScaler.

UGX Graphic Card

The UGX GRAPHIC CARD provides two Dual-DVI connectors to connect four display devices. For digital output, resolutions up to UXGA can be processed.

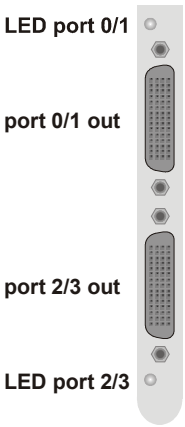


Figure 3-16
Ports of UGX GRAPHIC CARD

AGX Graphic Card

The AGX GRAPHIC CARD provides one Dual-DVI connector to connect two display devices. For digital output, resolutions up to SXGA can be processed.

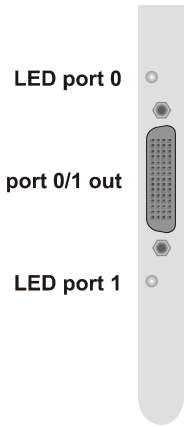


Figure 3-17
Ports of AGX GRAPHIC CARD

Depending on the configuration the card is delivered with different adapter cables:

- **Dual-DVI to 2xDVI-D adapter cable:**
  Digital output for display on projection modules with digital input.

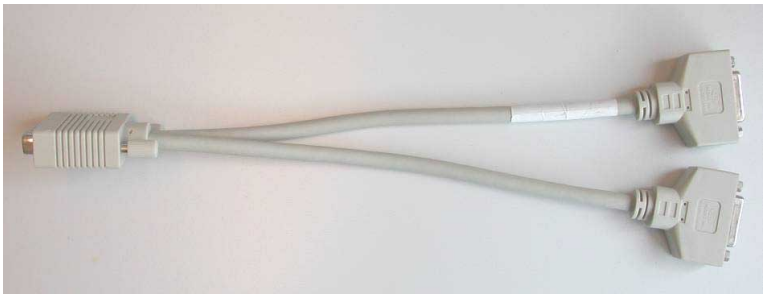


Figure 3-18
Dual-DVI to 2xDVI-D adapter cable

- **Dual-DVI to 2xCRT adapter cable:**
  Analog output for display on projection modules with analog input.

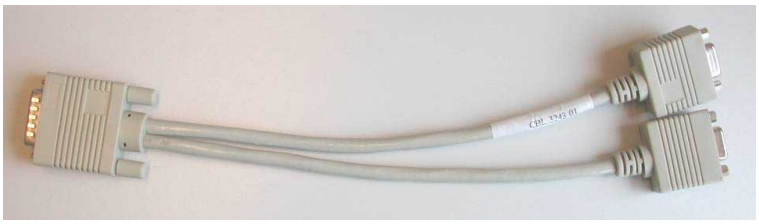


Figure 3-19
Dual-DVI to 2xCRT adapter cable

The DDC capable display devices must be connected to the graphic cards before Eos is switched on. If they are connected afterwards Eos will not be able to detect them!

Order

The first graphic card in respect to PCI slot numbering identifies itself as primary graphic adapter by lighting the green LED of the respective graphic channel when Eos is switched on. The primary graphic adapter is the channel, where the system emits diagnostic and status messages during system startup. The other graphic cards should be inserted in sequence into the PCI slots and are numbered consequently following the numbering of the PCI slots.

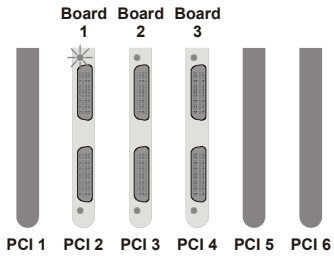


Figure 3-20
Green LED indicates board 1

Auf die genaue Reihenfolge der Grafikkarten wird in den Abschnitten 3.2.11 Eos Extender eingegangen.

AGX and UGX GRAPHIC CARDS may not be mixed within the same system! Please refer to section 6.1.5 Combination rules for information about mixing cards in digital and in analog mode.

Each UGX GRAPHIC CARD provides four ports for connecting projection cubes, monitors, projectors or VISU^{PLUS}. The upper connector contains **port 0** and **1**, the lower one contains **port 2** and **3**. Thus the default sequence of the graphic channels is:

board	1				2				3			
port	0	1	2	3	0	1	2	3	0	1	2	3
channel	1	2	3	4	5	6	7	8	9	10	11	12

Figure 3-21

Each AGX GRAPHIC CARD provides two ports, the upper one is **port 0**, the lower one **port 1**. Thus the default sequence of the graphic channels is:

board	1		2		3		4		5	
port	0	1	0	1	0	1	0	1	0	1
channel	1	2	3	4	5	6	7	8	9	10

Figure 3-22

For non default sequence see section 6.2.7 Advanced Eos configuration (channels).

The OVERVIEW projection modules are assigned from left to right (view from in front of the screens) or if arranged in a square numbered in rows starting at the top left:

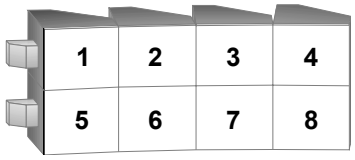


Figure 3-23
Numbering of projection channels

This numbering is carried on for distributed systems. For each rendering machine the modules are numbered as described.

Specifications

For detailed technical specifications of the graphic cards please refer to section 7.1 Technical data.

VGA-card

For configuring a distributed system, the graphical output of the central device must be displayed somewhere. Therefore a VGA monitor can be connected either to the VGA-Card of the central processor or if available to the onboard VGA adapter of the central device, please refer to section 3.1.1 Eos**.**

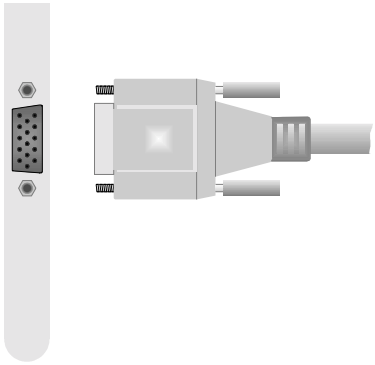


Figure 3-24
VGA-Card of the central device

3.2.6 OmniScaler

In addition to graphic cards, also OMNISCALERS are a substantial part of EOS to connect to projection modules. The OMNISCALERS provide the ability to integrate video and RGB data into the graphical data from the graphic cards. Therefore the **out** connector of the graphic card needs to be connected to the **in** connector of the OMNISCALER. Only graphic cards in digital mode can be connected. DDC information from the projection device is looped through to the graphic card for further processing.

The OMNISCALER exists in two versions. OMNISCALER **AGX-3313** is a replacement for the OMNISCALER **AGX-3002**. Within one system both types of OMNISCALERS can be used, provided that the requirements given in the table below are considered:

OmniScaler	maximal resolution / channel	required display driver
AGX-3002	SXGA	R 3.0 and higher
AGX-3313	UXGA	R 3.3 and higher

Table 3-1
Compatibility matrix of OMNISCALER versions

Connectors

The OMNISCALER provides one Dual-DVI connector for data insertion from the graphic card and one Dual-DVI connector for digital output for two projection modules.

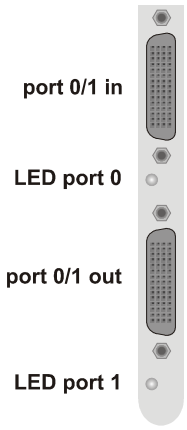


Figure 3-25
ports of the OMNISCALER

In every OMNISCALER card package a Dual-DVI to Dual-DVI cable is included. It serves to connect **port 0/1 in** of the OMNISCALER with **port 0/1** or **port 2/3** of the graphic card:

Figure 3-26
Dual-DVI to Dual-DVI adapter cable

For the connection to the projection modules the Dual-DVI to 2×DVI-D adapter cable that was provided with the graphic card is used. It must be plugged into **port 0/1 out** of the OMNISCALER.

Order

The OMNISCALERS are inserted into the PCI slots next to the graphic cards. They are numbered according to the graphic cards they are connected to. The OMNISCALER that is connected to the first graphic card (as primary graphic adapter) lightens also the green LED of the respective graphic channel.

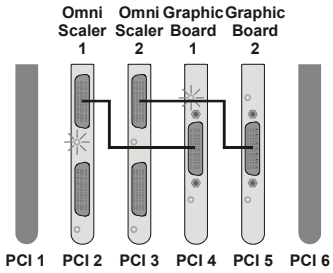


Figure 3-27
Numbering of OMNISCALERS

Specifications

For detailed technical specifications of the OMNISCALER please refer to section 7.1 Technical data.

3.2.7 Quad Analog Video Card

The QUAD ANALOG VIDEO CARD, provides the capability of displaying video signals like VCR, TV, CCTV etc. The analog video signals are digitized for further processing in the EOS. Four video signals can be processed simultaneously.

Standard

The video standards S-Video (S-VHS, Y/C) and Composite Video (VHS, FBAS, CVBS, CVS, Y) are supported.

Connectors

The QUAD ANALOG VIDEO CARD provides one LFH-160 pin connector for video insertion. In every QUAD ANALOG VIDEO CARD package a video breakout cable is included. The breakout cable itself provides eight BNC connectors that can be used to connect four S-Video or composite signals. The eight cables are marked with **CVBS/Y 1** to **4** or with **C 1** to **4** respectively, please refer to section 7.2 Interfaces for appropriate signal connection.

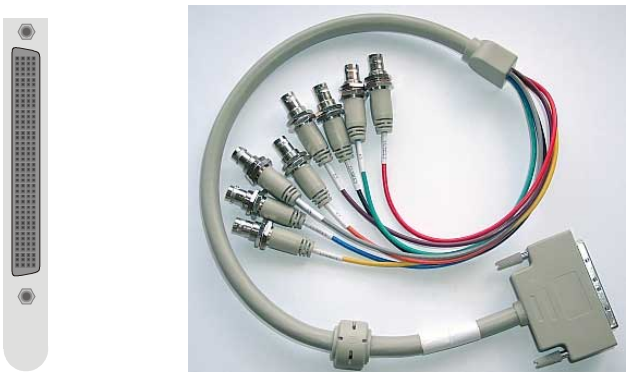


Figure 3-28
connector of the QUAD ANALOG VIDEO CARD (left) and video breakout cable (right)

Order

Within a single QUAD ANALOG VIDEO CARD the numbering of the video channels is as shown in the figure above. The QUAD ANALOG VIDEO CARDS are inserted into adjacent PCI slots. If more than one QUAD ANALOG VIDEO CARD is built-in, they are numbered in the sequence of the PCI slots.

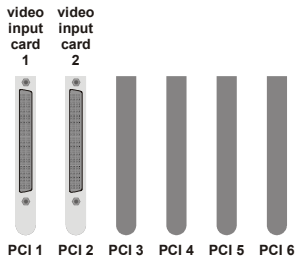


Figure 3-29
Numbering of video-input cards

With a single EOS without EOS EXTENDERS the numbering of the video channels as they are referred to by the video client (refer to section 4.6.2 The video channels, please) is identical with the numbering of the cards: **channel 1** is assigned to **video-input 1 card 1**, **channel 2** is assigned to **video-input 2 card 1**, and so on.

Within a distributed system there are many different possibilities to arrange video channels. Please, refer to section 6.2.7 Advanced Eos configuration**.**

Specifications

For detailed technical specifications of the QUAD ANALOG VIDEO CARD please refer to section 7.1 Technical data.

3.2.8 Streaming Video Card

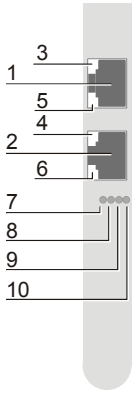
The STREAMING VIDEO CARD provides the capability of displaying compressed encoded digital video streams. The digital signal is decoded for further processing in the EOS. Up to four video streams can be processed simultaneously. The STREAMING VIDEO CARD allows a redundant connection to the Ethernet.

Standard

The STREAMING VIDEO CARD supports MPEG-2 streams over Ethernet. Please refer also to section 7.1 Technical data.

Connectors

The STREAMING VIDEO CARD provides two RJ45 connectors to establish the connection to the network. For a redundant connection a network cable should be plugged into each of the plugs [1] and [2]. These network cables should connect on the other side to a redundant network. In case of a failure of one connection the other connection will take over the complete network traffic. If a redundant connection is not required either plug [1] or plug [2] can be used for the connection. Both plugs use the same IP and MAC address, so no configuration in regard of the used plug is required.



1	RJ45 Network connector 1
2	RJ45 Network connector 2
3	green LED: connector 1 connected to the Ethernet
4	green LED: connector 2 connected to the Ethernet
5	green LED: ON connector 1 connected with 100 Mbps OFF connector 1 connected with 10 Mbps
6	green LED: ON connector 2 connected with 100 Mbps OFF connector 2 connected with 10 Mbps
7	stream 1 is active
8	stream 2 is active
9	stream 3 is active
10	stream 4 is active

Figure 3-30
connectors of the STREAMING VIDEO CARD

Order

The order of the STREAMING VIDEO CARDS in EOS is determined in exactly the same way as with the QUAD ANALOG VIDEO CARD. Refer to section 3.2.7 Quad Analog Video Card, please.

Specifications

For detailed technical specifications of the STREAMING VIDEO CARD please refer to section 7.1 Technical data.

3.2.9 Dual RGB Input Card

The DUAL RGB INPUT CARD provides the capability of displaying RGB monitor signals. Either two analog signals up to 1280×1024@75Hz or one analog signal up to UXGA resolution or higher are digitized for further processing in EOS.

Standard

The synchronization modes **Hsync+Vsync**, **Csync** and **Sync-on-Green** are supported.

Connectors

The DUAL RGB INPUT CARD has two VGA compatible 15-pin SubMinD connectors. Each is for connecting one RGB signal to the OMNIBUS. If an UXGA signal is inserted it must be connected to **RGB In 1**, while **RGB In 2** is not available.

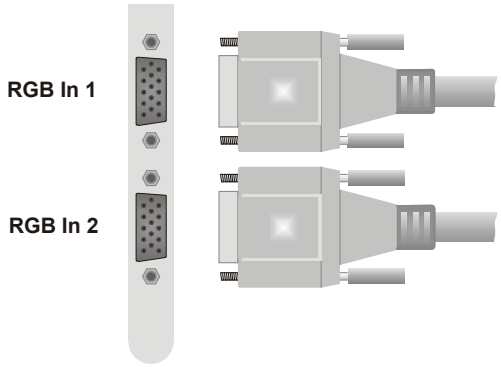


Figure 3-31
connector of DUAL RGB INPUT CARD

Order

Within a single DUAL RGB INPUT CARD the numbering of the video channels is as shown in the figure above. The order of the DUAL RGB INPUT CARDS in EOS is determined in exactly the same way as with the QUAD ANALOG VIDEO CARD. Refer to section 3.2.7 Quad Analog Video Card, please.

Specifications

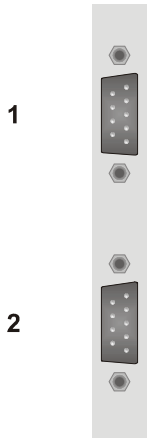
For detailed technical specifications of the DUAL RGB INPUT CARD please refer to section 7.1 Technical data.

3.2.10 Multiport I/O card

The Multiport I/O Card extends the system with additional serial connectors. They might be helpful for controlling multiple devices like VISU[PLUS] etc through the control room management software OSIRIS.

Connectors

The Multiport I/O Card has two serial sockets.



1	1st serial port
2	2nd serial port

Figure 3-32
Multiport I/O Card

Order

The Multiport I/O Card has to be inserted into one of the PCI slots. Eos supports up to three Multiport I/O Cards.

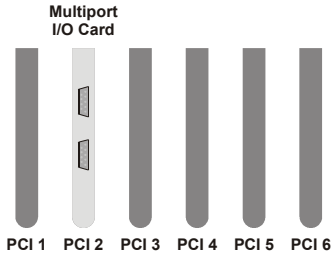


Figure 3-33
Position of Multiport I/O Card

3.2.11 Eos Extender

Power supply

Check the power rating on your outlet before connecting the Eos Extender to the wall outlet or to a power strip. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

The Eos Extender is designed to operate with single-phase power systems having a grounded neutral conductor. To reduce the risk of electrical shock, do not plug into any other type of power system.

To connect the Eos Extender to the power supply, follow these steps:

- The current Eos Extender model performs a voltage auto range. Elder models may have a voltage selector. If your model is equipped with a voltage selector, please make sure to select the appropriate type of power with the voltage selector on the back panel. You can choose between **115V**/60Hz AC and **230V**/50Hz AC.

Figure 3-34
Voltage selector

- Plug the female end of the power cords into the AC in [**6**].

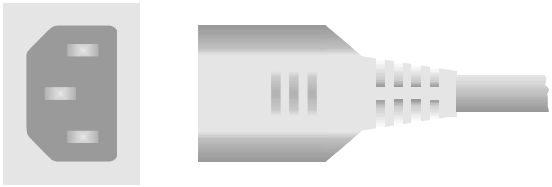


Figure 3-35
Mains connection

- Plug the male end of each power cord into a power outlet.

Connecting to Eos

The data connection between Eos and an Eos Extender is established with a ribbon cable or with a round cable.

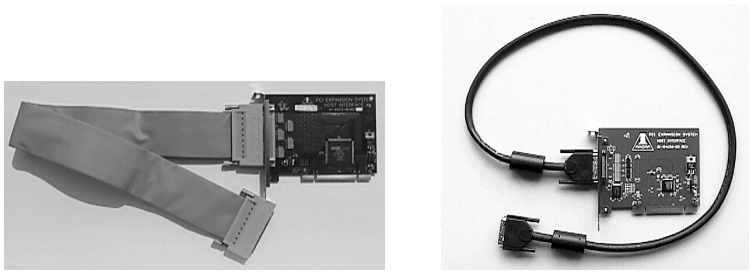


Figure 3-36
Ribbon cable (left) and round cable (right) connecting Eos and Eos Extender

The cable between Eos and the Eos Extender is fragile. It may not last under tension, or being bent or twisted.

Therefore, in both Eos and the Eos Extender a PCI card is inserted. I. e., in Eos one PCI slot is reserved.

Connecting several Eos Extenders

The number of Eos Extenders, which can be connected to Eos, is equal to the number of free PCI slots on its mainboard.

Order

The expansion cards are inserted in the PCI slots with the lowest numbers. If more than one Eos Extender is connected, they are numbered in the sequence of the PCI slots.

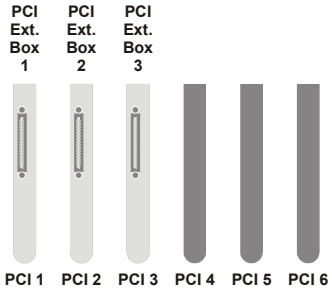


Figure 3-37
connection cards to the Eos Extenders

Order of graphic and input cards

In a configuration with Eos Extenders each type of card is separately numbered. The numbering of graphic cards and input cards follows the order implicitly given by the Eos Extenders and their interconnection. The OmniScalers are numbered according to the graphic cards they are connected to.

Numbering begins at the **PCI 1** slot of Eos. As soon as an Eos Extender is connected, numbering continues with the PCI slots of this Eos Extender. After that the remaining slots of Eos are numbered. The numbering is illustrated in the figure below.

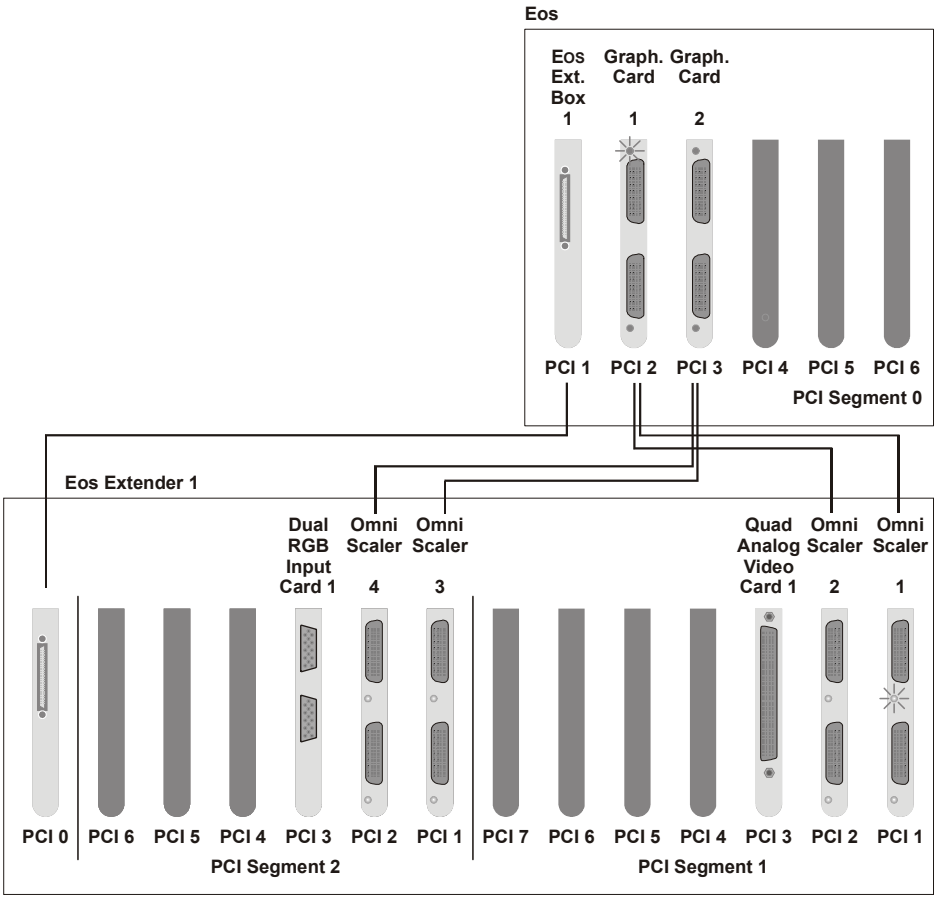


Figure 3-38
Example for the numbering in a configuration with an Eos Extender

Depending on the type of the cards used in one Eos or Eos Extender and the model of the device, the maximum amount of cards within the device varies, please refer to section 6.1.5 Combination rules**.**

3.2.12 Network

Network adapters

With Eos the following network adapters are available: The onboard LAN adapter on the mainboard, the Ethernet Card 100 Mbps as well as the Ethernet Card 1000 Mbps. These adapters are used to connect the Eos to the LAN (local area network) and to connect central device and rendering machines to the sub-net.

The onboard LAN adapter and the Ethernet Card 1000 Mbps have the ability to establish a 10 Mbps, 100 Mbps or 1000 Mbps connection. The Ethernet Card 100 Mbps has the ability to establish a 10 Mbps or 100 Mbps connection.

The sub-net connection is established via a Gigabit Ethernet Switch, see section 3.2.13 Distributed system.

Redundant network connection

For a redundant connection to the LAN the Ethernet Card 100 Mbps as well as the Ethernet Card 1000 Mbps are also available as server adapters, allowing to configure them in teaming mode, sharing one single IP-address. On the label on the card is indicated whether a network card is of server or desktop type. Please refer also to section 6.2.8 Redundant network adapter for more information.

Models

For the different applications the network cards are delivered in different models.

- **To connect an Eos to the LAN**
  Ethernet Card 100 Mbps
  Ethernet Card 1000 Mbps
  Onboard LAN Adapter

In a distributed system the rendering machines are booted via the sub-net by means of packets sent by the central device. Therefore the network adapter in the rendering machines must be capable to boot via a network. For the Eos-system there exist two different possibilities to achieve this. It depends on the hardware that is used in your Eos-system, which one of these two methods is used.

Former systems used special rendering Ethernet cards that carry Etherboot code which requests the needed boot packets as soon as the central device is booted. With Eos models RSEOS30265 and RSEOS33272 and from X server release 3.48 on no special rendering Ethernet cards are needed any longer (anyhow the usage of these cards remains supported). Instead PXE (the Pre-eXecution Environment) is used. For reliable function of this mechanism it is necessary that wake on LAN (WOL) is configured in the server configuration (see section 3.4.3 Configuring a distributed system) and that WOL is also enabled in the BIOS of the mainboard of the respective rendering machines (see section 6.2.10 BIOS settings for Wake On LAN)

- **To connect an Eos central machine to the sub-net**
  Ethernet Card 100 Mbps
  Ethernet Card 1000 Mbps
- **To connect an Eos rendering machine to the sub-net using PXE**
  Ethernet Card 100 Mbps
  Ethernet Card 1000 Mbps
  Onboard LAN Adapter
- **To connect an Eos rendering machine to the sub-net using Etherboot**
  Ethernet Card 100 Mbps, rendering
  Ethernet Card 1000 Mbps, rendering

Connectors

The onboard LAN adapter, the 100 Mbps and the 1000 Mbps network card offer each a Twisted Pair connection:

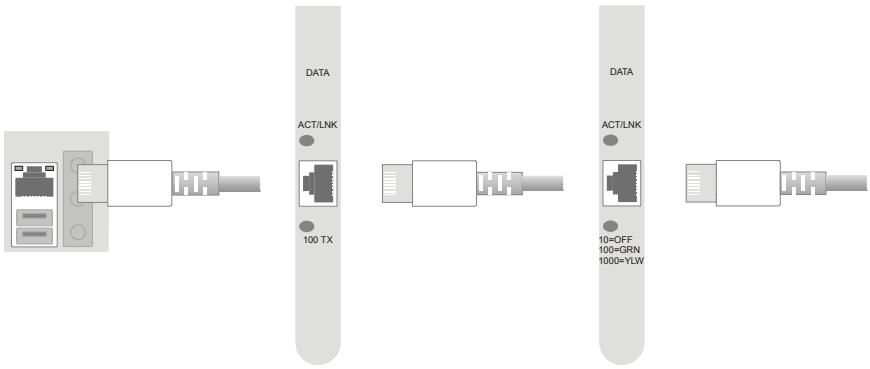


Figure 3-39
Connecting to Twisted Pair (RJ-45)
100 Mbps onboard LAN adapter (left), 100 Mbps Ethernet Card (middle) and 1000 Mbps Ethernet Card (right)

Order

The network cards are inserted in sequence into the PCI slots with the highest numbers. If more than one network card is built-in, they are numbered in ascending order for descending PCI slot numbers.

The Ethernet addresses are labeled on the network cards.

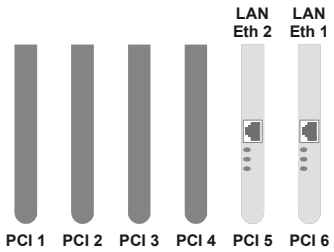


Figure 3-40
Example for inserting LAN and Sub-net network cards

If using different types of network cards, this type determines the order as well. The system detects first the onboard LAN adapter, then 100 Mbps network cards in the order of the PCI slots and finally the 1000 Mbps network cards. Therefore to get a straight numbering of the cards the 1000 Mbps network cards should be inserted in the PCI slots with the higher numbers than the 100 Mbps network cards.

3.2.13 Distributed system

With the distributed system, the OVERVIEW projection modules are connected to the graphic cards of the rendering machines. Each rendering machine operates a rectangular array of projection modules within a display wall. The actual subdivision into arrays depends on the requirements of each display wall (e. g. displaying video). The following figure shows an example for a 9×5 arrangement:

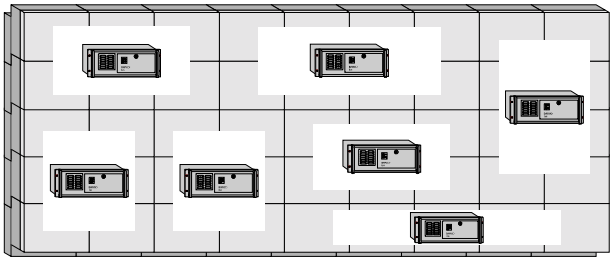


Figure 3-41
Example for the assignment of rendering machines and projection modules

Additional information about the assignment of rendering machines and projection modules can be found in section 6.2.7 Advanced Eos configuration (channels)**.**

The rendering machines are connected to the central Eos within a separate Sub-net (see also section 3.2.12 Network). Therefore the central unit is equipped with an additional network card. If also for the LAN connection an extra network card is used and not the onboard LAN adapter, then the network card with the lower Ethernet address, respectively the higher PCI slot number connects to the LAN, the card with the higher Ethernet address, respectively the lower PCI slot number connects to the Sub-net.

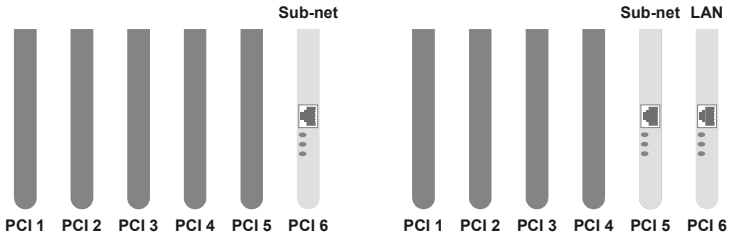


Figure 3-42
Example for network cards in the central processor:
LAN connection via onboard LAN adapter (left) and via a network card (right)

To connect the rendering processors to the sub-net either the onboard LAN adapters are used or the rendering machines are equipped with one network card each:

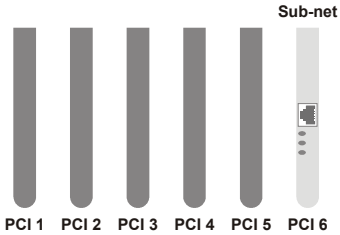


Figure 3-43
Network cards in a rendering processor

Sub-net

The Sub-net is established via a Gigabit Ethernet Switch. The Gigabit Ethernet Switch connects the rendering processors and the central processor. Up to 7 rendering processors and the central processor can be connected with one Gigabit Ethernet Switch. Switch

3.2.14 Visu[Plus]

The connection of VISU[PLUS] to EOS ULTRA is described in the VISU[PLUS] user's manual, see section, 7.3 Order codes please.

3.3 Starting Up

3.3.1 Connecting

First of all you have to provide the appropriate power supply. Plug in the power cables on the back panel of your Eos. Please, refer to section 3.2.1 Power supply!

Mouse and keyboard must be connected to the respective sockets on the rear of Eos. Please, refer to sections 3.2.2 Mouse and 3.2.3 Keyboard!

If necessary, connect the Eos Extenders to Eos. Please, refer to 3.2.11 Eos Extender!

Connect the graphic cards to the OmniScalers, if OmniScalers are used. Connect the display devices to the graphic cards or OmniScalers. At least one display must be connected for administrating Eos. Please, refer to 3.2.5 Graphic cards and 3.2.6 OmniScaler! Connect the video and RGB sources to the video-input cards of Eos. Please, refer to 3.2.7 Quad Analog Video Card, 3.2.8 Streaming Video Card and 3.2.9 Dual RGB Input Card!

Connect your Eos to the local area network! Connect the network to the appropriate port of the network card or to the network onboard adapter! Please, refer to 3.2.12 Network!

For configuring a distributed system, the central unit must be connected to a monitor. Refer to section 3.2.5 Graphic cards, please! Connect the rendering machines with the central Eos and the OverView modules or Visu^{Plus} with the rendering machines. Refer to section 3.2.13 Distributed system, please!

3.3.2 Switching on

Switch on Eos by pressing the **power** button on the front!

If you have expanded your Eos with Eos Extenders switch on these first.

There are two different boot modes for Eos. Normal boot mode and eXtended safety boot mode. See section 6.2.1 Boot modes. The operation of Eos differs a little, depending on this mode.

Normal boot mode

The displays show their respective bus and slot no., e. g.:

```
PCI Bus: 2, PORT: 1
```

After a few minutes the graphical user interface X.11 appears.

If software configuration has already been carried out you can go on with chapter 4 Operating. Otherwise proceed configuring Eos in section 3.4 Configuration software.

eXtended safety boot mode

The displays show their respective bus and slot no., e. g.:

```
PCI Bus: 2, PORT: 1
```

The Eos startup screen comes up. Select **linux** to boot from the working partition.

If you select backup, the restore procedure is started and the working partition becomes overwritten with the backup system, which might lead to a loss of current data, depending on the state of the backup, please see section 4.8.5 Backup and restore procedures (eosxs Utility)!

Figure 3-44
Eos startup screen

After a few minutes the graphical user interface X.11 appears.

If software configuration has already been carried out you can go on with chapter 4 Operating. Otherwise proceed configuring Eos in section 3.4 Configuration software.

3.3.3 Switching off

To switch off Eos save your work, remove any disk or CD from the drives and exit from any application. Terminate the X-Server, log on as root and enter **shutdown –h now** for shutting down or **shutdown –r now** for re-booting.

```
eos:/root # shutdown –h now
```

When Eos has shut down it switches off automatically.

To avoid any complications, it is recommended to switch off Eos in the way explained above!

The order in which you switch off Eos and Eos EXTENDERS is insignificant.

If Eos is switched off as explained above, not all parts are disconnected from the power supply. To disconnect the whole device the power plug has to be pulled out after switching off.

3.4 Configuration software

Eos comes to you with installed and pre-configured software. Nevertheless before you put Eos into operation, you have to run through a system configuration to insert the properties of your network like the IP address and the keyboard type. Furthermore an X.11 configuration is needed to adjust Eos to your local conditions.

3.4.1 System configuration

The following section describes how to change or insert the network configuration, keyboard properties, user properties or passwords.

To change the configuration log in as **root** and start the configuration utility. The factory set password for root is **barco**:

```
eos login: root
Password: barco
```

Enter **linuxconf**.

```
eos:/root # linuxconf
```

Navigate within the configuration window by using the **Tab** key and the **arrow** keys. A **+** in front of a folder significates the folder is open, a **–** significates the folder is closed. Select the folder by putting the focus on it (**Arrow up** key and **Arrow down** key) and confirming with the **Enter** key to change its state. An arrow after a word signalizes that there is a list hidden. Open the list by putting the focus on the word and pressing **<Ctrl> X**. Put the focus on a list item to select it and confirm.

There are also help files available. Each window contains a **Help** button. The **Help** button of the main window offers general help. The **Help** buttons of the sub windows offer help, concerning the content of the sub window.

Network configuration

Select **Config** : **Networking** : **Client Tasks** : **Host name and IP network devices**.

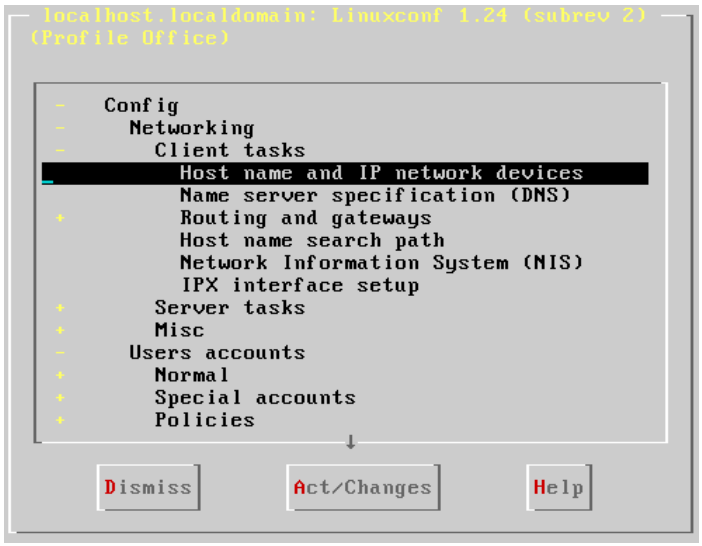


Figure 3-45

Up to four network cards are automatically detected during the system installation. This means the settings for net device and kernel module are correct if the cards have been present during installation. If a card is inserted afterwards also these settings have to be adopted. The drivers (Setting: **Kernel module**) for the different network cards are:

driver	network card	redundancy
3c509	Ethernetcard 10 Mbps, ISA	no
eepro100	Ethernetcard 100 Mbps, PCI	no
e100	Ethernetcard 100 Mbps, PCI	possible
e1000	Ethernetcard 1000 Mbps, PCI	possible
e1000	onboard LAN adapter (EOS-3026-5, EOS-3327-2 and higher)	no
bcm4400	onboard LAN adapter (EOS-3026-4, EOS-3327-1 and lower)	no

The section **Adaptor 1** treats the network options of the LAN connection of Eos. You can change them by selecting and editing them. If you are putting Eos into operation you have to change the pre-adjusted IP address to your own.

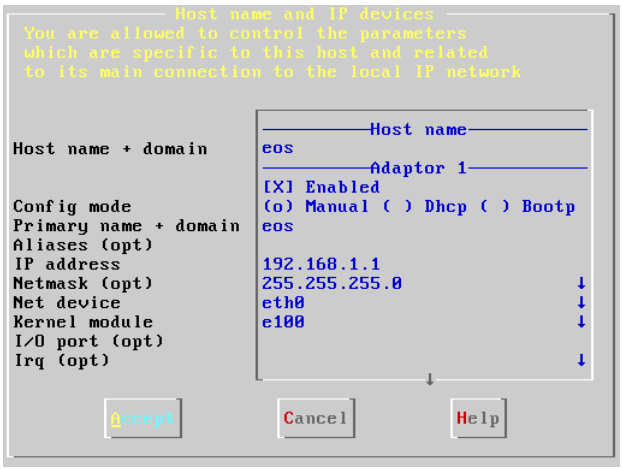


Figure 3-46

Take care to insert the same sub net IP address within the configuration for a distributed system as explained in section 3.4.3 Configuring a distributed system**.**
The section Adaptor 2 treats the network options of the subnet, used with the distributed system.

For the sub-net network card of the central unit, IP addresses must be specified.

Use the IP addresses **192.168.60.xxx** as long as it will not collide with any other subnet within the Internet. Select **192.168.60.254** for the central Eos. This enables the numbering of the rendering machines consequently with **1**, **2**, **3**, etc. Clarify the corresponding Netmask addresses with your network administrator. In the field **Primary name + domain** insert **eos-core**.

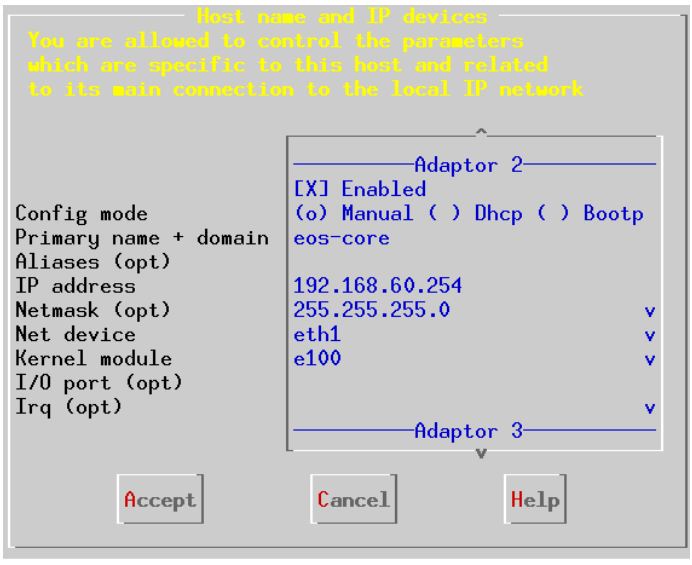


Figure 3-47

Confirm your changes with **Accept** or leave with **Cancel**.

Keyboard

Select **Control** : **Features**. The Features tab opens. Here is the keyboard map that provides the different keyboard types. You have also the possibility to choose the language in which the dialogs are held. Hit **Accept** when finished.

Time (optional)

If Eos is just used as X-terminal, it does no date & time related processing.

Select **Control** : **Date&Time**. Adjust Eos to your time and confirm with **Accept**.

User accounts (optional)

As Eos comes preconfigured with user <**mmt**> and password <**mmt**> usually defining an additional user account is not required.

Select **Config** : **Users accounts** : **Normal : User accounts.** This will open the Users accounts tab.

If you have more than 15 accounts on the system, Linuxconf will provide you with a filter screen. You can use this to select a smaller range of accounts than the full list. To get the full list, select **Accept** without changing any of the parameters.

Select **Add**. This will open the **User account creation** tab.

The **User account creation** tab is where you enter all the information on the new account. It has a number of fields; only the login name is required, though filling in the **Full name** field is strongly recommended. Once you have entered the login name and any other desired information select the **Accept** button. If you decide against creating a new user, hit **Cancel** instead.

Upon hitting **Accept** the configuration program will prompt you to enter the password. There is also a field called **Confirmation** where you will need to type the password again. Passwords must be at least 6 characters in length. They may contain numbers as well as a mix of lowercase and uppercase letters. Hit **Accept** when finished.

Changing a user's password (optional)

Select **Config** : **Users accounts** – **Normal** – **User accounts**. This will open the **Users accounts** window. Select the account whose password you wish to change. This will open the **User information window**. Select **Passwd** from the options at the bottom of the screen.

The configuration software will then prompt you to enter the new password. There is also a field called **Confirmation** where you will need to type the password again. This is to prevent you from mistyping the password. Passwords must be at least 6 characters in length. They may contain numbers as well as a mix of lowercase and uppercase letters. If you decide against changing the password, just hit **Cancel**. Once you have entered the new password select **Accept**.

You have to reboot Eos to make changes become effective.

If you operate Eos in eXtended safety boot mode, please take care to update the backup partition after successful configuration, see section 4.8.5 Backup and restore procedures (eosxs Utility)**.**

3.4.2 X.11 configuration

For the X.11 configuration of Eos the script call must be entered in line mode. Therefore leave X.11 for configuration purposes with the following keys pressed simultaneously:

<Ctrl> <Alt> <Backspace>

Now, back in line mode log in as **root**! The factory set password for root is **barco**:

```
eos login: root
Password: barco
```

Configuration can be carried out by means of the configuration script **EOSconfig**. To start this script change the directory first:

```
eos:/root # cd /opt/MMT2686/config/
```

then execute the script:

```
eos:/opt/MMT2686/config # ./EOSconfig
```

EOSconfig will guide you through the configuration. You can exit configuration without saving the modifications at any time by pressing simultaneously:

<Ctrl> C

Thus all parameters entered up to now were deleted again. It is more convenient however to check all data necessary for configuration first and then start the script. Therefore you are recommended to read through the following pages of this section before starting the configuration.

Below you can read through a typical course of the configuration script expanded with comments giving more details.

```
*********************************************************
*                                                       *
*       Eos X Server Configuration                      *
*       Release 3.4.x                                   *
*       (c)2005  BARCO                                  *
*                                                       *
*       email : support.bcd@barco.com                   *
*         Tel : 0049-721-6201-0                         *
*         Fax : 0049-721-6201-298                       *
*                                                       *
*********************************************************


1   Config Eos Multi-Screen X Server
2   Config Eos Distributed X Server
3   Config Visu Plus Standalone X Server
4   Config Eos Multiple Logical Screens X Server
5   Exit

Enter your X Server Configuration [1]: 1
Customized Configuration (yes/no)? [no]: no
```

The value indicated in square brackets will be taken by simply pressing **<Return>**. This can be the default value if the configuration script is running the first time or the value entered during the last configuration.

The first question allows you to choose between the configuration of a single Eos [**1**], a distributed system [**2**], an X server for VISU^{PLUS} standalone [**3**] or an Eos configuration with multiple logical screens[**4**]. Entering [**5**] exits the script.

Configuring a distributed system is largely similar to configuring a single Eos. In this section configuration of a single Eos is demonstrated, but this part is identical for both kinds of configuration. See section 3.4.3 Configuring a distributed system **for the additional parts.**

The configuration of an X server to control a VISU^{PLUS} standalone is explained in section 3.4.4 Configuring an X server for VisuPlus standalone. Please continue there, if configuring the X server for VISU^{PLUS} standalone.

The second question allows you to choose between a complete and a custom configuration, see section 6.2.5 Custom configuration.

Mouse device

You can connect different types of mice. Please enter the type of mouse you want to use and specify its properties! If you have a PS/2 mouse you must select:

- `8.  PS/2 MicrosoftIntelliMouse and compatible Wheel Mice` or
- `12.  No Mouse` with OSIRIS where Eos is operated without local mouse.

```
Configuring the Monolithical X Server
=====================================

Settings for the Input Devices
==============================
Please enter the required settings for
 - Mouse
 - Cursor size

Configuring the Mouse Device
----------------------------
First specify a mouse protocol type. Choose one from the following list:

 1.  Microsoft Mouse and compatible 2-buttons Mice
 2.  Mouse Systems 3-buttons Mice
 3.  MM Series
 4.  Logitech Mouse (old type, Logitech protocol)
 5.  Logitech MouseMan (Microsoft compatible)
 6.  MM HitTablet
 7.  PS/2 Microsoft Mouse and compatible Mice
 8.  PS/2 Microsoft IntelliMouse and compatible Wheel Mice
 9.  PS/2 Microsoft IntelliMouse Explorer
```

```
10.  Bus Mouse
11.  Unknown
12.  No Mouse

Enter a protocol number [7]: 8

Do you want to use the USB device (yes/no)? [no]: no
```

X11 big mouse cursor

In particular for big display walls, it can be useful to enlarge the mouse pointer. Indicate the desired magnification factor:

```
Configuring the Big Mouse Cursor
--------------------------------
When using the X Server with high resolution
the standard cursors are hard to track for some people.
Therefore you can define magnified mouse cursors.
Following magnification factors are available:

  factor 1      :  standard cursors
  factor 2..8   :  magnified cursors

Enter the magnification factor [1]: 2

These are your Input Device settings
====================================
    - Cursor size:              Factor 2
    - Mouse Protocol:           "ImPS/2 "
    - Mouse device:             PS/2: "/dev/psaux"
Everything correct? (yes/no)? [yes]: y

Settings for the Output Devices
===============================
Please enter the required settings for
 - Graphic Card Types (AGX-3000 or AGX-3281)
 - Output Signal (analog or digital)
 - Monitor Resolution (only for analog devices)
 - Refresh Rate
 - Screen Type (Multi Head or Multi Screen; only monolithic Server)
 - Screen Arrangement (only monolithic Server)
```

Graphic card

Select the graphic card. Eos supports from X server release 3.4 on exclusively the UGX and AGX Graphic Cards.

```
Setting the Graphic card type
-----------------------------
    1 - "AGX-3000"
    2 – "AGX-3281"

Enter the graphic card type [2]: 2
```

Output signal

Select the output signal type.

```
Configuring the output signal
-----------------------------
    1 - "Analog"
    2 - "Digital"

Enter the output signal  [2]: 2
```

Monitor resolution and refresh rate

If you have analog output the monitor resolution and the refresh rate has to be specified. In case of analog and digital mixed output just the refresh rate for the analog outputs is to be specified.

Multi-screen server display layout

In multi-screen-mode the display wall is operated as a single large display area. Refer to section 4.1 Multi-screen capability for a more detailed description, please!

The arrangement of the connected projection modules is specified in the form:

<w>x<h>

Here <w> and <h> give the number of columns and rows. For example:

4x2

4 monitors next to each other, 2 monitors on top of each other.

```
Configuring the Monolithic X Server Display Mode
------------------------------------------------
    1: Multi Screen
    2: Multi Head

Enter the X Server Screen mode [1]: 1

Configuring the Monolithic X Server Multiscreen Arrangement
-----------------------------------------------------------
Enter the Multi Screen Arrangement (Width x Height) [2x1]: 4x2

These are your Output Device settings
=====================================
    - Graphic Card:             AGX-3281
    - Output Device:            digital
    - Screen  Configuration :   MultiScreen (4x2)
Everything correct? (yes/no)? [yes]: y

X Server General Settings
=========================
Please enter the required settings for
 - Visual Depth
 - Visual Class
 - X Server's background RGB values
 - XDM
 - Font Server
```

Depth resolution

Specifying the depth resolution tells X.11 how many colors you want to use.

```
Configuring the Depth resolution (Bit Per Pixel)
(N,B: 4 and 5 are Usable only for resolution up to 1400x1050)
 1  - for  8 bpp (256 colors)
 2  - for 16 bpp (64K colors)
 3  - for 32 bpp (16M colors)
 4  - for  8  and 16 bpp (MultiDepth/MultiColor: Default visual = PseudoColor
 5  - for 16  and  8 bpp (MultiDepth/MultiColor: Default visual = TrueColor)
Enter the depth resolution  [2]: 4
```

Dependent on the configuration and the requirements for video the depth resolution must be selected. An extensive overview about correlation between settings of X.11 and the display of video as well as an explanation of multi-color-depth is given in section 4.2.2 Color capabilities of Eos. An overview about bandwidth requirements of video and RGB in dependence of color depth is given in section 4.6.1 The input cards.

Visual class

Specifying a visual class tells X.11 how to handle colors. This is only asked if you selected above the numbers 2 or 4. Refer also to section 4.2 Color management for a more detailed description, please!

Background of the X server

The background of the X server can be set. Specify, if you want to set your individual background color and how. In RGB values red is 255 0 0, green is 0 255 0 and blue is 0 0 255. You can choose any combination of these colors within the range of 0 to 255.

```
Configuring the X Server's background
-------------------------------------
Do you want set the X-Server's background color (yes/no)? [yes]: yes
Enter the RGB values [range 0..255] [0 0 0]: 40 40 200
```

X display manager

The X display manager, `xdm`, is a system process which manages a user session from the login to the logout. `xdm` provides a flexible and configurable method for logging in with an X server. Refer to section 4.3 X display manager for a more detailed description, please!

Entering **y** allows you to specify the query type, entering **n** causes X.11 to start without `xdm`.

- `query` will connect you directly to the specified XDM;
- `indirect` will cause a chooser box to be opened, where you can select your XDM;
- `broadcast` will connect you to the XDM that replies first to your request.

```
Configuring X Display Manager (XDM)
-----------------------------------
The local X Display Manager can be used to login on the Eos X Terminal.

Do you want start the X Server with XDMCP (yes/no)? [yes]: y

Set the XDMCP Query Types
    1 - query (direct)
    2 - indirect
    3 - broadcast
Enter query type  [2]: 2
Enter the ip address of your XDM [150.158.181.149]: 199.123.222.17
```

Font server

Please specify, if you want to use a font server. If necessary clarify the IP address as well as the respective port number with your network administrator!

```
Configuring the Font Server
---------------------------
If you want a Font Server which supplies fonts for the X Server,
please answer the following question with either 'y' or 'n'

Do you want to use a Font Server (yes/no)? [yes]: y
Enter the ip address of your Font Server [150.158.181.149]: 199.123.222.17
Enter the Font Server's port number [7100]: 7100
```

The script lists your settings. Examine the values and confirm them by entering **y** or enter **n** for repeating the previous configuration steps.

```
These are your X Server General Settings
========================================
   - Bits Per Pixel:        8 and 16
   - Visual Class:          default visual = PseudoColor; 2nd visual = TrueColor
   - X Server's RGB Values: 40 40 200
   - XDM Protocol:          -indirect 199.123.222.17
   - Font Server:           tcp/199.123.222.17:7100

Everything correct? (yes/no)? [yes]: y
```

Channel reordering

For some installations it is useful to change the order of the projection channels. This can be assigned in the Channel Reordering section. If you want to reorder the projection channels enter **y**. By entering **n** this section will be skipped.

```
X Server's Channel Reordering
=============================
This is the reordering configuration part of the X Server.
It offers the possibility to define the reordering channels section.
The channels section defines the assignment of graphic channels
to projection channels.
Please read the section "X Server Configuration" in the
User's Manual "Eos X Terminal"

Do you want to proceed  (yes/no)? [no]: y
```

The correlation between graphic channels and projection channels is explained in section 6.2.7 Advanced Eos configuration (channels). Please have a look there to have a further explanation.

```
Channel Reordering
==================

Assign to a default graphic channel
a new position in the Display Wall


Channel Reordering:
------------------
1: redefine reordering
2: take default (no reordering)
Enter selection [1]: 1
Enter the list of the default channels [1 2]: 1 2 3 4 5 6 7 8
Enter the list of the new channels [2 1]: 1 3 5 7 2 4 6 8

These are the Reordering Settings for the Monolithic X Server:
============================================================
  1 2 3 4 5 6 7 8 --> 1 3 5 7 2 4 6 8

Everything correct? (yes/no)? [yes]: y
```

Fire wall

A firewall security level can be set. Four different levels (high, medium, disabled, user defined) can be chosen to disable unneeded network services.

The four security levels allow selecting between the following characteristics:

General Restrictions	
X Display Manager	X Display Manager `xdm` can only be started and port 177 is only accessible, if it was indicated in the section above (X Display Manager) to start `xdm`.
Font Server	The Font Server `xfs` can only be used if it was indicated in the section above (Font Server) to use a Font Server.
Network File System	The Network File System NFS is only activated if a distributed system is configured.
Root Filesystem	The root filesystem "/" is only exported if a distributed system is configured and it can only be mounted to the rendering machines.
High	
TCP/UDP ports	all ports less or equal 1023 are disabled except: TCP/UDP port 177 for XDMCP TCP/UDP port 161 for SNMP
daemons	the following daemons are disabled: **rsh-daemon** **login-daemon** **secure shell daemon**
Medium	
TCP/UDP ports	all ports less or equal 1023 are disabled except: TCP/UDP port 177 for XDMCP TCP/UDP port 161 for SNMP TCP port 513 for rlogin TCP port 514 for rsh TCP port 22 for secure shell
daemons	the following daemons are enabled: **rsh-daemon** **login-daemon** **secure shell daemon**
Disable	
TCP/UDP ports	all ports are enabled
daemons	the following daemons are enabled: **rsh-daemon** **login-daemon** **secure shell daemon**
User defined (don't change the existing firewall policies)	
TCP/UDP ports, rsh-daemon, login-daemon, secure shell daemon	None of these ports and daemons is disabled. Changes in the configuration of these ports and daemons by the user, will not be changed by the X.11 configuration.

Table 3-2
Security options

```
Setting the Eos FireWall Policies
=================================
If you want to configure the Eos as secure
X Terminal, choose the policy "high"
then only X11-Connection are permitted

Choose one of the FireWall Policies
-----------------------------------
    1 - "High"
    2 - "Medium"
    3 - "Disable"
    4 - "Don't change the existing FireWall Policy"

Enter the FireWall Policies  [2]: 2

You have chosen the FireWall Policy "Medium"
Is this correct? (yes/no)? [yes]:y
```

Finishing the configuration

If you do install a single Eos, configuration is done and the script is finished with the next step. When configuring a distributed system you have to specify the data for the central unit and the rendering machines. See section 3.4.3 Configuring a distributed system.

```
**************************************************************************
*                                                                        *
*  The EOS-X configuration is finished now, please enter your choice     *
*                                                                        *
**************************************************************************

1   Exit configuration (all your current entries will be lost)
2   Finish configuration

Enter your X Server Configuration  [2]:2


The EOS-X System will be configured now.  Please wait ...

****************************************************************

    Multiscreen X Server setup done... Have fun!

    NOTE: enter "service mmtserv"
                to start the EOS X Server


****************************************************************
```

When configuration is completed, you can enter **`service mmtserv`** to start the X server:

```
eos:/opt/MMT2686/config # service mmtserv
```

If you operate Eos in eXtended safety boot mode, please take care to update the backup partition after successful configuration, see section 4.8.5 Backup and restore procedures (eosxs Utility)**.**

3.4.3 Configuring a distributed system

Configuring a distributed system is largely similar to configuring a monolithic system. See section 3.4.2 X.11 configuration for the basic course of the installation script. This section describes the additional part for configuring a distributed system.

On the one hand, the additional sections in the configuration of a distributed system contain the specification of the Sub-net and on the other hand, the successive parameterization of every individual rendering machine.

Subnet

Indicate the transmission rate of the sub-net network card and the desired interface type!

```
Configuring Distributed X-Server's Subnet
=========================================
You want to install the Distributed Server therefore
additional configuring values are needed:
 - Setting Subnet Network Interface Card (only for 10 MBit Card)
 - Engines' Subnet
 - Engines' IP-Address
 - Engines' Multiscreen Arrangement
```

The IP address of the sub-net network card of the central unit must be specified identical to the IP address specified with linuxconf. See section 3.4.1 System configuration.

You have to insert the sub-net specification according to the specifications explained in section 3.4.1 System configuration. Changes have to be made in a consistent way in both places.

```
Enter IP Address for the subnet NIC card[192.168.149.254]: 192.168.60.0
Enter Sub Netmask of graphic engines [255.255.255.0]: 255.255.255.0
```

Rendering machines

The parameterization of the Eos rendering machines is carried out successively for every device. For every Eos rendering machine, the arrangement of the OverView projection modules is indicated in the following form:

```
<w>x<h>
```

Here <w> and <h> give the number of columns and rows. For example:

```
4x2
```

4 monitors next to each other, 2 monitors on top of each other.

For every rendering machine, the position of the projection modules, that is the position of the upper left module is indicated, in the following form:

```
<x>,<y>
```

Here <x> and <y> give the horizontal and vertical position within the display wall starting with the upper left module as `0,0`.

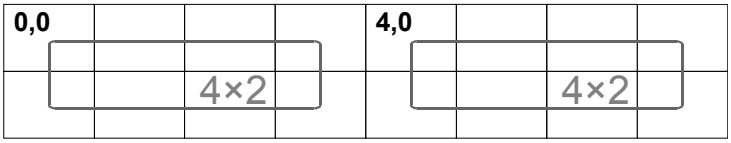


Figure3-48

For each rendering machine a unique IP address within the specified sub-net must be provided. In addition the Ethernet addresses of the rendering machines' network cards must be entered. The Ethernet address is printed on a label on the network card. For example:

EA=00.60.97.78.29.0a

As well the Ethernet address can be read from the output during the boot process.

```
Enter number of graphic engines [2]: 2
   IP address for engine 1 [192.168.149.1]: 192.168.60.1
   Ethernet address for engine 1 [00.00.00.00.00.00]: 00.60.08.a6.a9.58
   Screen arrangement for engine 1 (Width x Height) [2x4]: 4x2
   Position for engine 1 (X,Y) [0,0]: 0,0

   IP address for engine 2 [192.168.149.2]: 192.168.60.2
   Ethernet address for engine 2 [00.00.00.00.00.00]: 00.60.08.a6.a9.73
   Screen arrangement for engine 2 (Width x Height) [2x4]: 4x2
   Position for engine 2 (X,Y) [0,0]: 4,0
```

Next there is the choice to enable Wake On LAN for the network adapters of the rendering machines. From Release 3.48 of the X server on PXE can be used to boot the rendering machines. In this case Wake On LAN must be activated, to enable the rendering machines to boot and reboot reliable. If still the Etherboot mechanism is used Wake On LAN can also be activated but there is no need to do so.

Please refer to section 3.2.12 Network for a short explanation of Etherboot and PXE boot mechanism and in case you activate WOL check also for the appropriate BIOS settings, see section 6.2.10 BIOS settings for Wake On LAN.

```
Engine's boot mode Configuration
--------------------------------
The Engines can be switched on by the Core Machine
by using the WOL (Wake On LAN) facility.
(NB: When using WOL you have to enable WOL
     also in the motherboard BIOS)
Do you want to use WOL (yes/no)? [no]: yes
```

The script lists your settings. Examine the values and confirm them by entering **y**, or enter **n** for repeating the previous installation steps.

```
These are your Distributed Server settings
==========================================
   - Core machine's second IP:  192.168.149.254
   - Engines Netmask Address:   255.255.255.0
   - NIC card:                  100 Mbit
   - Number engines :           2
   - Values for engine 1:       IP = 192.168.149.1 Ether = 00.60.08.a6.a9.58
                                arrangement = 4x2 position = 0,0
   - Values for engine 2:       IP = 192.168.149.2 Ether = 00.60.08.a6.a9.73
                                arrangement = 4x2 position = 0,0
   - WakeOnLAN :                Yes
Everything correct? (yes/no)? [yes]: y
```

Channel reordering

For some installations it is useful to change the order of the projection channels. This can be assigned in the Channel Reordering section. If you want to reorder the projection channels enter **y**. By entering **n** this section will be skipped.

```
X Server's Channel Reordering
=============================
This is the reordering configuration part of the X Server.
It offers the possibility to define the reordering channels section.
The channels section defines the assignment of graphic channels
to projection channels.
Please read the section "X Server Configuration" in the
User's Manual "Eos X Terminal"

Do you want to proceed (yes/no)? [no]: y
```

The order can be changed only within the rendering machines (graphic engines). First the engine has to be indicated then the graphic channels (default) and the projection channels (new) can be entered. The correlation

between graphic channels and projection channels is explained in section 6.2.7 Advanced Eos configuration (channels). Please have a look there to have a further explanation.

```
Channel Reordering for the Distributed X Server
===============================================
Assign to a default graphic channel within a
graphic engine a new position in the
Display Wall

Enter graphic engine's number for reordering[1]: 1

Channel Reordering:
-------------------
1: redefine reordering
2: take default (no reordering)
Enter selection [1]: 1
Enter the list of the default channels [1 2]: 1 2 3 4
Enter the list of the new channels [2 1]: 1 2 4 3
Reordering of a new engine? (yes/no)? [no]: y

Enter graphic engine's number for reordering[2]: 2

Channel Reordering:
-------------------
1: redefine reordering
2: take default (no reordering)
Enter selection [1]: 1
Enter the list of the default channels [1 2]: 1 2 3 4
Enter the list of the new channels [2 1]: 4 3 2 1
Reordering of a new engine? (yes/no)? [no]: n


These are the Reordering Settings for the Distributed X Server:
===============================================================
  engine_1 :1 2 3 4  --> 1 2 4 3
  engine_2 :1 2 3 4  --> 4 3 2 1

Everything correct? (yes/no)? [yes]: y
```

Logic video channels

The assignment of the adapters of QUAD ANALOG VIDEO CARDS or STREAMING VIDEO CARDS to a »logic« video channels can be defined. This assignment is explained in detail in section 6.2.7 Advanced Eos configuration (video). The numbers of the assigned channels result like described there and have to be inserted into the lines of the respective rendering machines (`engine-1`, etc.).

```
Logical Video Channels
======================
This is the configuration part for the assignment of Phisical Video Adapters
to Logical Video Channels.
This assignment specifies which video is displayed on which part of
the Display wall.
Please read the section "X Server Configuration" in the
User's Manual "Eos X Terminal"

Do you want to proceed  (yes/no)? [no]: y

Logical Video Channels:
-----------------------
1: define Video settings
2: take default Video settings
Enter selection  [1]: 1
Enter for each video channel the video adapters for engine-1 [1]: 1 2 0
Enter for each video channel the video adapters for engine-2 [1]: 0 1 2

These are the Logical Video settings for the Distributed X Server:
==================================================================
  engine_1 : 1 2 0
  engine_2 : 0 1 2

Everything correct? (yes/no)? [yes]: y
```

Finishing the configuration

```
*************************************************************

       Distributed  X Server setup done... Have fun!

       NOTE: enter "service mmtserv"
           to start the EOS X Server

*************************************************************
```

When configuration is completed, you can enter **`service mmtserv`** to start the X server:

```
eos:/opt/MMT2686/config # service mmtserv
```

If you operate Eos in eXtended safety boot mode, please take care to update the backup partition after successful configuration, see section 4.8.5 Backup and restore procedures (eosxs Utility)**.**

3.4.4 Configuring an X server for Visu^{Plus} standalone

The configuration script for an X server for Visu^{Plus} standalone is started as explained in section 3.4.2 X.11 configuration. As well the resolution of the projection modules controlled via Visu^{Plus} as the arrangement of the modules has to be inserted.

Resolution of output

The resolution of the projection modules controlled via Visu^{Plus} has to be indicated:

```
You want to install the X Server for The Visu Plus
following values are needed:
 - Visu Screen Resolution
 - Visu Screen Arrangement

Enter the Visu Screen Resolution (Width x Height) [1024x768]: 800x600
```

Screen arrangement

The arrangement of the projection modules is indicated in the following form:

```
<w>x<h>
```

Here <w> and <h> give the number of columns and rows. For exapmle:

```
4x2
```

4 monitors next to each other, 2 monitors on top of each other.

```
Configuring the Monolithic X Server Multiscreen Arrangement
-----------------------------------------------------------
Enter the Visu Screen Arrangement (Width x Height) [1x1]: 2x2

These are your Visu Plus settings
=================================
    - Visu  Screen Resolution  :    800x600
    - Visu  Screen Arrangement :    2x2
Everything correct? (yes/no)? [yes]: y


*****************************************************************

 Visu Plus Standalone X Server setup done... Have fun!

 NOTE: enter "service mmtserv"

      to start the EOS X Server


*****************************************************************
```

When configuration is completed, you can enter **service mmtserv** to start the X server:

```
eos:/opt/MMT2686/config # service mmtserv
```

3.4.5 Configuring a distributed system with multiple logical screens

Configuring a distributed system with multiple logical screens is largely similar to configuring a monolithic system. See section 3.4.2 X.11 configuration for the basic course of the installation script. This section describes the additional part for configuring multiple logical screens.

More information concerning multiple logical screens can be found in the sections 4.1 Multi-screen capability and 6.2.7 Advanced Eos configuration. The configuration runs mostly along the X.11 configuration and the configuration of a distributed system.

Mode of multiple logical screens

Select the multiple logical screens mode. If you select separate mode you are also prompted to indicate whether you want cursor wrap or not (Please see the keyword `NoCursorWrap` in section 6.2.7 Advanced Eos configuration).

```
Configuring the Multiple Logical Screen X Server
================================================

There are two modes of MLS operation
   1 - Contiguous mode
   2 - Separate mode
Please enter the MLS mode  [1]:

Switching on the cursor wrap around feature (yes/no)? [no]: no
```

Subnet and rendering machines

Next the subnet and the Rendering Machines are configured. Please see section 3.4.3 Configuring a distributed system. The number of rendering machines (graphic engines) is asked. For each rendering machine the IP address and the arrangement must be specified. The position of the engine is only asked, if you configure continuous mode. Furthermore the type of the graphic card must be indicated and the depth resolution must be assigned.

```
Subnet Configuration
--------------------
Enter IP Address for the subnet NIC card[192.168.1.254]:
Enter Sub Netmask of graphic engines [255.255.255.0]:

Graphic Engines' Configuration
------------------------------

Enter number of graphic engines [2]:
IP address for engine 1 [192.168.1.1]:
Ethernet address for engine 1 [00.00.00.00.00.00]: 00.a0.c0.83.76.98
Screen arrangement for engine 1 (Width x Height) [2x4]: 2x2
Position for engine 1 (X,Y) [0,0]:

Graphic card type for engine 1
  1 - "AGX-3000"
  2 – "AGX-3281"
Enter the graphic card type  [1]: 2

Configuring the Depth Resolution (Bit Per Pixel)
------------------------------------------------
 1  - for  8 bpp (256 colors)
 2  - for 16 bpp (64K colors)
 3  - for  8 and 16 bpp (MultiDepth/MultiColor feature)
      Usable only for resolution up to 1400x1050
 4  - for 32 bpp (16M colors)

Enter the Depth Resolution [3]: 2

Configuring the Visual Class
----------------------------
A visual class describes the characteristics of a virtual colormap,
that has been or can be created for use a particular screen

The following visual class are supported.
    1  - TrueColor     (read only  visual)
    2  - DirectColor   (read/write visual)
```

```
Enter the Visual Class [1]: 1

IP address for engine 2 [192.168.1.2]:
Ethernet address for engine 2 [00.00.00.00.00.00]: 00.a0.c0.83.54.77
Screen arrangement for engine 2 (Width x Height) [2x4]: 2x2
Position for engine 2 (X,Y) [0,0]: 2,0
Graphic card type for engine 2
  1 - "AGX-3000"
  2 – "AGX-3281"
Enter the graphic card type  [1]: 2

Configuring the Depth Resolution (Bit Per Pixel)
------------------------------------------------
 1  - for  8 bpp (256 colors)
 2  - for 16 bpp (64K colors)
 3  - for  8 and 16 bpp (MultiDepth/MultiColor feature)
      Usable only for resolution up to 1400x1050
 4  - for 32 bpp (16M colors)

Enter the Depth Resolution [3]: 2

Configuring the Visual Class
----------------------------
A visual class describes the characteristics of a virtual colormap,
that has been or can be created for use a particular screen

The following visual class are supported.
    1  - TrueColor     (read only  visual)
    2  - DirectColor   (read/write visual)

Enter the Visual Class [1]: 2

These are your MLS Server settings
==================================
   - Core machine's second IP:  192.168.1.254
   - Engines Netmask Address:   255.255.255.0
   - Operational mode :         Contiguous
   - Number engines :           2
   - Values for engine 1:       IP = 192.168.1.1 Ether = 00.a0.c0.83.76.98
                                arrangement = 2x2  position = 0,0
                                AGX-3281: Bpp = 16  Visual = TrueColor

   - Values for engine 2:       IP = 192.168.1.2 Ether = 00.a0.c0.83.54.77
                                arrangement = 2x2  position = 2,0
                                AGX-3281: Bpp = 16  Visual = DirectColor

Everything correct? (yes/no)? [yes]:
```

Finishing the configuration

After specifying the parameters for multiple logical screens the values explained in section 3.4.2 X.11 configuration and section 3.4.3 Configuring a distributed system must be indicated.

```
************************************************************

        MLS X Server setup done... Have fun!

        NOTE: enter "service mmtserv"
                    to start the EOS Distributed X Server

************************************************************
```

When configuration is completed, you can enter **`service mmtserv`** to start the X server:

```
eos:/opt/MMT2686/config # service mmtserv
```

If you operate Eos in eXtended safety boot mode, please take care to update the backup partition after successful configuration, see section 4.8.5 Backup and restore procedures (eosxs Utility)**.**

3.4.6 Configuring Osiris

The configuration of Osiris is explained in the Osiris user's manual. For the Osiris user's manual see section 7.3 Order codes.

4 Operating

This chapter shows the capabilities that Eos offers displaying graphics and video. The multi-screen capability of Eos, the extensions of the X server and the X window system's strategies for color management are explained. You are introduced into operating the video client for displaying video and RGB signals and the remote control client for controlling an OverView display wall.

4.1 Multi-screen capability

An essential feature of Eos is the **multi-screen** capability, which differs in some points from the multi-head mode of a conventional X server.

The X server of Eos allows a root window that extends over all connected projection modules. In this case, X clients use the whole display area, without even knowing this (**transparent multi-screen**).

For an exact description of the differences between multi-screen and multi-head mode, the terms **display** and **screen** of X.11 terminology are important:

Display

A display contains all input and output devices, which are assigned to an X server. Two or more displays may be installed on a single computer. In this case several X servers are running each of which has its own keyboard (mouse, tablet etc.) and its own screen; however, both servers operate logically independent from each other so that two separate workplaces are available.

Screen

A screen is a logic output device of an X server which is represented generally by a physical output device. An X server can quite operate several screens. However, such a construction has only one keyboard and one mouse. It is a workplace for a single person.

The difference between a conventional X server in multi-head mode with several monitors and the multi screen-capable Eos controlling a display wall is described below.

Multi head

Every screen is represented in the multi-head mode by a corresponding monitor and has its own root window. An X client, which is connected to this server can open windows on both screens. However, an individual window is always completely attached to a screen. Moreover, the client must be specifically programmed for the use of several screens, what is hardly the case among standard X.11 applications. In addition, when starting such clients the output screen must be indicated immediately. Finally there are only few window managers, which allow consistent management over several screens.

Multi screen

In multi-screen mode Eos offers – in the sense of X.11 – only a single root window, which extends over the whole display wall with an unlimited number of projection modules. Every window manager allows to position the windows of any client somewhere on the display wall, to displace them to another projection module or even to expand them over several or all projection modules simultaneously.

Multiple logical screens

With the multiple-logical-screens mode Eos combines in a way the multi-head mode and the multi-screen mode. It allows one X server to display multiple screens each on an individual rectangular array of m×n graphic channels. Each screen can be configured with its own color depth and visual class. Multiple-logical-screens can only be used with a distributed system. Each rendering machine displays one screen.

The configuration of multiple-logical-screens is explained in section 6.2.7 Advanced Eos configuration (geometry).

Note that multiple logical screens can not be used simultaneously together with the X MultiCursor extension (XMC), see section 4.4 X server extensions**.**

4.2 Color management

4.2.1 Basic understanding

The translation between RGB values specified in applications and the color displayed on-screen is controlled by pixel values serving as indices to a color map. The application obtains the pixel values from the X window system.

RGB values

RGB values are the red, green and blue intensity values that are used to define a color. According to the X.11 protocol these values are represented as 16-bit, unsigned numbers, with 0 the minimum intensity and 65535 the maximum intensity. Most hardware however represents each value as a number in the range from 0 to 255.

Color map

A color map consists of a set of numbered entries – so called color cells – defining pixel values. Each color cell contains a single RGB triple – a combination of RGB values. The color map will be filled at runtime.

X.11 supports two ways for handling color maps:

- **shared color cell**
  Colors that can be used by different X clients are called shared colors. A color that was once allocated can not be changed. When an X client is requesting for a shared color the X server searches the color map for exactly the requested color (exact match). If the color is not found a new color will be allocated in the color map.
- **private color cell**
  A color that can only be used by one client is considered to be a private color. Only the client that allocated it can use a private color. A client is able to change the contents of a private cell. As long as entries are available in the color map, private colors can be allocated.

Color depth

On a black-and-white screen, each pixel is represented with a single binary digit, i. e. a color depth of 1. Many color workstations have a color depth of 8bit, each pixel on such a screen is represented by eight bits, allowing 2^8 = 256 on-screen colors. A color depth of 24 bits corresponds to 2^{24} = 16.7 million (16M) colors and is said to cover all shades of colors the human eye can distinguish.

Visual class

Due to the different display capabilities of workstations reaching from a color depth of 1 bit up to 24 bits different strategies for translating pixel values into on-screen colors have been developed in the X window system. These strategies are called visual classes.

The X window system defines six visual classes, three of them are dynamic (**PseudoColor**, **GrayScale**, **DirectColor**) and three are static (**StaticColor**, **StaticGray**, **TrueColor**):

- **PseudoColor**
  is a class having a color map in which a pixel value indexes the color map entry to produce an independent RGB value; that is, the color map is viewed as an array of triples (RGB values). Shared and private color cells can be allocated.
    - **StaticColor**
      can be viewed as a case of PseudoColor in which the RGB values are predefined and read-only; no private color cells are available.
- **GrayScale**
  can be viewed as a case of PseudoColor, in which the red, green, and blue values in any given color map entry are equal and thus, produce shades of gray Shared and private color cells can be allocated.
    - **StaticGray**
      can be viewed as a case of GrayScale in which the gray values are predefined and read-only; no private color cells are available.
- **DirectColor**
  is a class of color map in which a pixel value is decomposed into three separate subfields for indexing. The first subfield indexes an array to produce red intensity values. The second subfield indexes a second array to produce blue intensity values. The third subfield indexes a third array to produce green intensity values. Shared and private color cells can be allocated.
    - **TrueColor**
      can be viewed as a case of DirectColor in which the subfields in the pixel value directly encode the corresponding RGB values. That is, the color map has predefined read-only RGB values.

Further documentation

The color management of the X window system is explained in more detail in:

- **The Definitive Guide to the X Window System – Volume 1**
  Adrian Nye, O'Reilly & Associates, Inc.
- **Introduction to the X Window System**
  Oliver Jones, Prentice Hall, Inc.

4.2.2 Color capabilities of Eos

Visual classes

For operating your Eos you can use the following combinations of visual class and color depth, depending on which kind of application is to be displayed:

- **DirectColor, 16bit (R: 5bit, G: 6bit, B: 5bit) for displaying video**
  2^{16} = 64K colors can be displayed. Shared and private color cells are available.
- **DirectColor, 32bit (R: 8bit, G: 8bit, B: 8bit) for displaying video**
  2^{24} = 16M colors can be displayed. Shared and private color cells are available.
- **TrueColor, 16bit (R: 5bit, G: 6bit, B: 5bit) for displaying video**
  2^{16} = 64K colors can be displayed. The possible RGB values in the color map are predefined in equidistant steps. Thus it is guaranteed that the whole spectrum of colors is covered.
- **TrueColor, 32bit (R: 8bit, G: 8bit, B: 8bit) for displaying video**
  2^{24} = 16M colors can be displayed. The possible RGB values in the color map are predefined in equidistant steps. Thus it is guaranteed that the whole spectrum of colors is covered.
- **PseudoColor, 8bit with NearBy Color Allocation for displaying pure 8 bit applications**
  2^{8} = 256 colors out of 256^{3} = 16M can be displayed. Shared and private color cells are available. The maximum number of shared and private color cells together is 256.

NearBy color allocation

X clients may exit on an allocation of a shared or private color cell, if the color map is already full and the requested color cell is not included in the color map, yet. However, the NearBy Color Allocation guarantees, that each request for a shared color cell returns a color cell, whether or not the color map is already full or an entry in the color map matches the request. Please, refer to section 6.2.9 Nearby color allocation for more details.

Multi-color-depth

With the multi-color-depth option of the X server two color modes, 8 bit PseudoColor and 16 bit TrueColor, are available for X clients in parallel. The root window runs in one color mode whereas X clients may also display windows in the other color mode. Multi-color-depth can be configured in the following way:

- 8 bit PseudoColor for the root window and 8 bit PseudoColor or 16 bit TrueColor as Option for X clients
- 16 bit TrueColor for the root window and 8 bit PseudoColor or 16 bit TrueColor as Option for X clients.

By default most X clients start in the same color mode that the X server uses for the root window. Some X clients have the ability to use alternatively another color mode. There are two types of such X clients that can make use of this feature:

- X clients that need to be started with an option identifying the wanted color mode
- X clients that have the ability to automatically start in the color mode most suitable to display their content

This feature is available with UGX Graphic Cards and for resolutions up to 1400×1050.

OmniScaler

The OmniScaler enables to display video and RGB sources no matter in what color mode and color depth the X server operates. Thus optimal integration of 8 bit PseudoColor applications with high quality video and RGB display is possible. If the X server operates in 8 bit PseudoColor mode, the video / RGB window is displayed in YUV4:2:2 / 16 bit TrueColor mode. Complete correlation between color mode of the X Server and the video/RGB window is listed in the table below.

Module video

With Module Video the video or RGB signals of the QUAD ANALOG VIDEO CARD, STREAMING VIDEO CARD or DUAL RGB INPUT CARD are displayed without borders and fitted to complete projection modules (1 to n×n, depending on configuration). The same color capabilities apply as with movable and scalable video and RGB windows. Please, refer also to section 4.6.3 The Xvideo client for more details.

Visu^{Plus}

With the external Video Insertion Unit VISU^{PLUS}, video and RGB-data can be displayed in 24 bit RGB format whereas the X server operates independently in 8 bit, 16 bit or 32 bit color modes. Video windows are freely moveable over 4 cubes per VISU^{PLUS} unit.

Dual RGB Input Card

The DUAL RGB INPUT CARD offers the possibility to provide RGB data either in 16 bpp (RGB 5:6:5) or in 24 bpp (RGB 8:8:8). Switching between these two modes requires a restart of the X server with the respective option set, please refer to section 6.2.6 X server parameters.

Overview of color capabilities

The following table lists color depth and format of the video and of the X clients in dependence of color depth and visual class of the X server. The video and RGB color format applies with module video as well as with video in a window.

	QUAD ANALOG VIDEO CARD / STREAMING VIDEO CARD	DUAL RGB INPUT CARD	application windows of X clients
PseudoColor 8 bit	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp [2)]	color mode of X server
multi-color-depth PseudoColor 8 bit and TrueColor 16 bit overlay [1)]	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp [2)]	color mode of X server or 16 bit TrueColor
DirectColor 16 bit	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp [2)]	color mode of X server
TrueColor 16 bit	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp [2)]	color mode of X server
multi-color-depth TrueColor 16 bit and PseudoColor 8 bit overlay [1)]	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp [2)]	color mode of X server or 8 bit PseudoColor
DirectColor 32 bit	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp [2)]	color mode of X server
TrueColor 32 bit	Video in YUV4:2:2	RGB format with 16 bpp or RGB format with 24 bpp [2)]	color mode of X server

Table 4-1
color capabilities for X server and video of Eos

1) Only applicable, if UGX GRAPHIC CARDS are used.

2) Depending on X server start option.

4.3 X display manager

The X display manager xdm is a system process which manages a user session from the login to the logout. The xdm provides a flexible and configurable method for logging in with an X server. The xdm can be configured such that X.11 clients are started automatically. The X server is reset for the next login following each user log-out.

X display manager of Eos

The X display manager comes pre-installed with the system on your Eos. Depending on the actual configuration the xdm is started automatically and opens a chooser box offering all possible xdm hosts accessible by your Eos.

On Eos there are manual pages about the xdm available. For reading these man pages enter **man xdm** in the command line:

```
eos:/root # man xdm
```

X display manager of host computers

The X display manager for the host computers of Eos is not included in the delivery of Eos.

Further documentation

The X display manager is documented in:

- **X Window System Administrators Guide – Volume 8**
  O'Reilly & Associates, Inc.

This document specifically describes all configuration possibilities for the X display manager using corresponding files.

4.4 X server extensions

Besides some standard X server extensions Eos offers a set of additional specialized X server extensions. These extensions are mentioned here briefly. Full documents for software development are available on request.

X MultiCursor (XMC)

The X MultiCursor extension allows the simultaneous use of several mouse pointers, which can be moved independently from each other over the root window. The XMC extension behaves like the standard X.11 input extension of the X Consortiums and can be handled exactly the same way.

Note that the X MultiCursor can not be used simultaneously together with multiple logical screens, see section 4.1 Multi-screen capability**.**

X Blink

With the X Blink extension, a blinking property can be put on shared color cells. A blinking color has two color information. These two colors are changed with an optional frequency. DIN blinking frequencies are provided.

X Video

The X Video extension for connecting a Barco video input card is dealt with in detail in the following chapter.

X UCL

This extension is required for Osiris. The functionality includes authorization mechanisms for X Clients and support of constraint areas for windows.

X MVGS

This extension is required for Osiris. It offers layout configuration management and remote pointer.

Multiple logical screens can be used together with Osiris and the X MVGS, X UCL extension only in the contiguous mode.

4.5 Window manager

The window manager which is pre-configured on Eos offers a convenient and fast way to choose certain commands. By clicking on the root window background depending on left click or right click a menu opens.

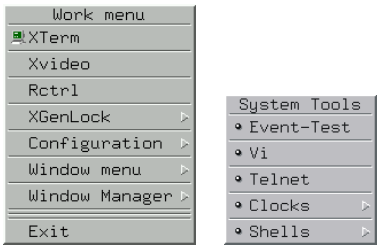


Figure 4-1
Left click and right click on the root window background

Work menu

Xterm	Start X terminal window
Xvideo	Start Xvideo client for displaying video and RGB
Rctrl	Start REMOTE-CONTROL client
Xgenlock	without functionality
Configuration	
Screensaver	
Default	Set screensaver to default settings
Immediately	Set screensaver to immediate screensaving
Blank	Set screensaver to blank display
Pattern after 5 min off	Set screensaver to switch off pattern after 5 minutes
Off	Switch screensaver off
Mouse	
Fast	Set speed of mouse to fast
Normal	Set speed of mouse to normal
Slow	Set speed of mouse to slow
Left handed mouse	Configure mouse for left handed operation
Right handed mouse	Configure mouse for right handed operation
System beep	
Loud and long	Set system beep to loud and long
Loud	Set system beep to loud
Normal	Set system beep to normal
off	Switch off system beep
Root Background	
BARCO logo	Select Barco logo as background for root window
Standard black	Select black as background for root window
Standard white	Select white as background for root window
Standard gray	Select gray as background for root window
Standard navy blue	Select navy blue as background for root window
Grid 640x480	Display adjustment grid (maintenance)
Grid 800x600	Display adjustment grid (maintenance)
Grid 1024x768	Display adjustment grid (maintenance)
Grid 640x480 bold	Display adjustment grid (maintenance)
Grid 800x600 bold	Display adjustment grid (maintenance)
Grid 1024x768 bold	Display adjustment grid (maintenance)
Restart Eos X Server	

default mode	Restart X server in default color mode
pseudo 8 Bit color mode	Restart X server in PseudoColor mode, 8bpp
true 16 Bit color mode	Restart X server in TrueColor mode, 16 bpp
direct 16 Bit color mode	Restart X server in DirectColor mode, 16 bpp
true 32 Bit color mode	Restart X server in TrueColor mode, 32 bpp
direct 32 Bit color mode	Restart X server in DirectColor mode, 32 bpp

Alternatively the X server can by restarted by means of the restart X server utility, please refer to section 4.8.4 Restart X server utility (service mmtserv).

It is not possible to restart the X server in multi-color-depth, if an other color mode has been configured in the X.11 configuration.

But if the X server has been configured in multi-color-depth it can be restarted with the other color depths mentioned above. To revert to multi-color-depth the X server must be restarted in the default mode.

Please keep in mind that a higher color depth requires also a higher bandwidth for graphic data.

In addition, changing the color mode of the X server might change the color mode of video or RGB and lead therefore also to an increase in required bandwidth for video, please refer to section 4.2.2 Color capabilities of Eos **to see which video color mode applies for which X server color mode and if the X server color mode is applicable for the used graphic cards and to section** 4.6.1 The input cards **to see the required bandwidth for video and RGB.**

Both effects might lead to a loss of performance!

Window Menu	
Move	Move window
Resize	Resize window
Iconify	Iconify window
Maximize/Normal	Maximize window, respective return to normal
(Un)Stick	Stick window to its position on a virtual desktop
Refresh	Refresh window
Raise	Raise window
Lower	Lower window
Next	Next window
Previous	Previous window
Window list	Display window list
Close	Close window
Kill	Kill window

Fvwm2	
Restart Fvwm2	Restart window manager
Modules	
Audio	(Please, refer to the fvwm2 man pages!)
AutoRaise on	(Please, refer to the fvwm2 man pages!)
AutoRaise off	(Please, refer to the fvwm2 man pages!)
Banner	(Please, refer to the fvwm2 man pages!)
Buttons	(Please, refer to the fvwm2 man pages!)
Debug	(Please, refer to the fvwm2 man pages!)
Icon Box	(Please, refer to the fvwm2 man pages!)
Icon Man	(Please, refer to the fvwm2 man pages!)
Ident	(Please, refer to the fvwm2 man pages!)
Pager	(Please, refer to the fvwm2 man pages!)
Save	(Please, refer to the fvwm2 man pages!)
SaveDesk	(Please, refer to the fvwm2 man pages!)
Scroll	(Please, refer to the fvwm2 man pages!)
Talk	(Please, refer to the fvwm2 man pages!)
WinList	(Please, refer to the fvwm2 man pages!)

System tools

EOSinfo	Display release integrity status, please refer also to section 4.8.6 Release integrity utility (eosinfo).
Event Test	Start event monitor
Vi	Start vi text editor
Telnet	Start telnet client
Clocks	
Analog	Display analog clock
Digital	Display digital clock
Shells	
Bash	
Bash	Start bash shell
Big bash	Start big bash shell
Login bash	Start login bash shell
Tcsh	
Tcsh	Start tcsh shell
Big tcsh	Start big tcsh shell
Login tcsh	Start login tcsh shell

4.6 Displaying video and RGB signals

This section describes the display of video and RGB signals with Eos Compact and Eos Power. The display of video and RGB signals with Eos Ultra is described in the user's manuals of Visu^{Plus} and Osiris, see section 7.3 Order codes.

Video and RGB signals can be displayed on an Barco display wall with the optional input cards Quad Analog Video Card, Streaming Video Card and Dual RGB Input Card. Based on an extension library of the X server the Barco video client `xvideo` allows the convenient handling of analog video, streaming video and RGB signals.

Simultaneous operation

Multiple input cards can be operated simultaneously. In this case, the corresponding video windows may freely overlap. For large display walls a distributed system with separate PCI segments may be required.

OmniScaler

Due to the dual color mode capability of the OmniScaler, Eos can display video and RGB signals in their native color mode e.g. YUV4:2:2 and 16 bit RGB TrueColor while the X Server operates in 8 bit PseudoColor mode with 256 colors. Please, refer to section 4.2 Color management for more details.

One OmniScaler provides the capability to process up to 128 video and RGB inputs simultaneously. Video and RGB data is triple buffered. Therefore only entire frames are displayed in sync with the graphical data to avoid frame tearing.

Backend scaling

The OmniScaler is able to do backend scaling. Scaling the video data at the backend of data transfer chain (Input card -> PCI-Bus -> OmniScaler) has its big advantage in a reduced need of PCI Bus bandwidth. Furthermore the OmniScaler provides up-scaling capabilities until full-screen resolution and far beyond.

The backend scaling uses linear interpolation for calculating new pixels.

In standard configuration the X server, depending on the size of the video window and the type of the input card automatically controls the usage of backend scaling.

Dependant on the scaling factor either the OmniScaler or the input card scales data. As soon as the size of the video or RGB window is larger than 1:1 the OmniScaler scales data up to the displayed size. If the video is displayed in a lower resolution than 1:1, then the input card itself performs a downscaling, to reduce the need of bandwidth for the data transfer.

Module video

The Quad Analog Video Card, Streaming Video Card and the Dual RGB Input Card can also display videos and RGB signals respectively without borders and fitted to complete projection modules (1 to n×n, depending on configuration). The display is always »on top«, other applications are »behind« and can not be manipulated by accident. If the display is removed from the desktop (quit or iconified) all covered applications show up again immediately.

In a distributed system the display wall is controlled by multiple rendering machines. If a video shall be displayed on the display areas of multiple rendering machines, all concerned rendering machines must be supplied with the video signal.

4.6.1 The input cards

For showing information from external sources like video or RGB data on a Barco display wall a set of input cards is provided. For integration of video the QUAD ANALOG VIDEO CARD and the STREAMING VIDEO CARD is available and for RGB data the DUAL RGB INPUT CARD can be used. Multiple input cards can be inserted into an EOS.

An X video application allows to display the sources connected to the input cards in individual windows on the display wall, that can be freely scaled and moved within the projection cubes connected to EOS. The display options can be set in a dialog box.

Quad Analog Video Card

Four different video sources (VHS or S-VHS) can be connected to a QUAD ANALOG VIDEO CARD and displayed simultaneously.

Streaming Video Card

Up to four MPEG-2 D-1 or CIF video streams per STREAMING VIDEO CARD can be decoded and displayed simultaneously by one STREAMING VIDEO CARD.

Dual RGB Input Card

The DUAL RGB INPUT CARD digitizes one or two analog monitor signals. In dual input mode it supports two monitor signals with a pixel frequency between 10 MHz and 135 MHz, in single input mode it supports one signal with a pixel frequency up to 270 MHz. The most common VESA timings are stored as presets. In addition, user defined timings can be saved. The timing and aspect ratio of the connected RGB signal are detected automatically.

The DUAL RGB INPUT CARD has an automated static frame rate reduction depending on number and type of the signals it processes, please see the table below.

	static frame rate reduction*	**used socket**
dual input mode (two signals, both ≤ 1280×1024@75Hz)	1/3	RGB in 1 **AND** RGB in 2
single input mode (one signal ≤ 1280×1024@75Hz)	1	RGB in 1 **OR** RGB in 2
single input mode (one signal > 1280×1024@75Hz)	½	RGB in 1

Table 4-2
static frame rate reduction for RGB sources
(* values are valid from release of the X server 3.4 on and Control ware 6 of the DUAL RGB INPUT CARD)

To take advantage of the higher frame rate for signals ≤ 1280×1024@75Hz in single input mode, the other socket may be connected to a second signal but that signal may not be displayed on the display wall.

The X video application allows selecting additionally a dynamic frame rate reduction of the source, which must be multiplied to the static frame rate reduction to obtain the overall frame rate reduction, please refer also to section 4.6.4 Displaying video and RGB signals.

Amount of video and RGB windows

The number of video and RGB data that can be processed in an Eos system underlies the available bandwidth. These are 100 MBps. The following table gives an overview about the bandwidth required for some standard window sizes. In the last column there is in addition the value of maximal windows of that type. This value is valid if only windows with the specified properties are displayed.

type	number of pixels	frame rate [fps]	color depth [bpp]	bandwidth [MBps] 1:1 or higher / (2:1)	max. amount of windows 1:1 or higher / (2:1)
Sources of Quad Analog Video Card and Streaming Video Card					
NTSC	640×480	30	16	**19 / (5)**	**5 / (21)**
PAL/SECAM	720×540	25	16	**20 / (5)**	**5 / (20)**
Sources of Dual RGB Input Card					
XGA	1024×768	10	16	**16 / (4)**	**6 / (25)**
XGA	1024×768	15	16	**24 / (6)**	**4 / (16)**
XGA	1024×768	20	16	**32 / (8)**	**3 / (12)**
SXGA	1280×1024	10	16	**27 / (7)**	**3 / (15)**
SXGA	1280×1024	15	16	**40 / (10)**	**2 / (10)**
SXGA	1280×1024	20	16	**53 / (14)**	**1 / (7)**
UXGA	1600×1200	10	16	**39 / (10)**	**2 / (10)**
UXGA	1600×1200	15	16	**58 / (15)**	**1 / (6)**
UXGA	1600×1200	20	16	**77 / (20)**	**1 / (5)**
XGA	1024×768	10	24	**24 / (6)**	**4 / (16)**
XGA	1024×768	15	24	**36 / (9)**	**2 / (11)**
XGA	1024×768	20	24	**48 / (12)**	**2 / (8)**
SXGA	1280×1024	10	24	**40 / (10)**	**2 / (10)**
SXGA	1280×1024	15	24	**59 / (15)**	**1 / (6)**
SXGA	1280×1024	20	24	**79 / (20)**	**1 / (5)**
UXGA	1600×1200	10	24	**58 / (15)**	**1 / (6)**
UXGA	1600×1200	15	24	**87 / (22)**	**1 / (4)**

Table 4-3
size of video/RGB data and number of displayable video windows in case that only this type of video window is displayed by the system

To calculate the bandwidth for windows of different sizes or frame rates the following formula can be used:

$$B = res_x * res_y * fr * cd$$

The abbreviations have the following meaning:

- **res_x, res_y – resolution of the source in x- and y-direction in pixels**
  It is important to consider the final scaling used to display the window. Up-scaling of the input sources is performed in the OMNISCALER therefore data is transferred 1:1 and the original resolution must be inserted into the formula. If the source is displayed smaller than 1:1 the source is downscaled directly in the input card. The original size of the different video types can be read from the table above.
- **fr – frame rate**
  For video a frame rate of 25fps (PAL/SECAM) and 30fps (NTSC) is standard. For dynamic RGB input a frame rate of 20 fps in normal cases gives an acceptable performance. If the RGB-source is mostly static even lower frame rates can be selected.

- **cd – color depth**
  For all video windows with the color mode YUV 4:2:2 is used, which means the factor is
  cd = 2
  For RGB windows two different color modes may be useful, please refer to section 4.2.2 Color capabilities of Eos:
  Color mode = **RGB 16 bpp** **cd = 2**
  Color mode = **RGB 24 bpp** **cd = 3**

With the effective bandwidth of the Eos system of 100 MBps the sum of the bandwidth of the individual windows may not be bigger than 100 MBps to provide optimal performance:

100 MBps = B_1 + B_2 + ... + B_n

Bandwidth optimization for video and RGB windows:

All optimization settings are made by means of the X video client, please refer to the section 4.6.4 Displaying video and RGB signals.

Frame rate
For video sources there are two settings with different frame rate reduction factors selectable to optimize the bandwidth usage. For RGB sources the static reduction of the frame rate depends on the input mode and the dynamic frame rate reduction is selectable. (Use the **Fps** setting for video data and **Reduction** for RGB data respectively and refer to the subsection Dual RGB Input Card above)

Color depth
RGB sources can be digitized with 16 bpp or with 24 bpp (depending on the visual class of the X server).

4.6.2 The video channels

For digitalization of the analog or streaming video data and of RGB sources, a hardware module (**adapter**) is necessary. Each video and RGB adapter offers one input (**port**). Accordingly, the QUAD ANALOG VIDEO CARD as well as the STREAMING VIDEO CARD has 4 adapters with one port each and the DUAL RGB INPUT CARD has two adapters with one port each.

The EOS system automatically creates video channels according to the available input adapters by simply assigning one channel per adapter in the order in which the input cards are inserted into the PCI slots of the EOS.

In a distributed system in addition the order of the rendering machines is considered when creating the numbers of the video channels.

In a monolithic system where input cards are located in multiple OMNIBUS devices, the video display is restricted to the display area of the respective PCI segment where the input card is plugged in.

In a distributed system video adapters of multiple rendering machines (one from each rendering machine) can be integrated to a »logic« video channel. A logic video channel can be displayed on the display area of all appendant rendering machines.

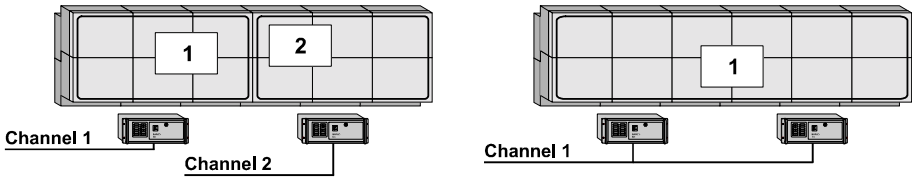


Figure 4-2
video input cards in different rendering machines
left: operated separately, right: as one logical channel

The configration of logical video channels is done by means of the configuration script EOSconfig, please refer to section 3.4.3 Configuring a distributed system**. Additional background information about the configuration of logical video channels can be found in section** 6.2.7 Advanced Eos configuration**.**

4.6.3 The Xvideo client

For displaying videos and RGB signals on the display wall an X client is available. The client is called `xvideo` and handles all inputs from QUAD ANALOG VIDEO CARD, STREAMING VIDEO CARD and DUAL RGB INPUT CARD.

The video client `xvideo` can be started as follows:

```
# xvideo [-<option>]
```

After `xvideo` is started two windows show up: the **control panel** and the **canvas panel**. The control panel offers controls for customizing the display. Whereas the canvas panel displays the video or RGB data. The video client detects automatically what kind of signal is connected to channel 1.

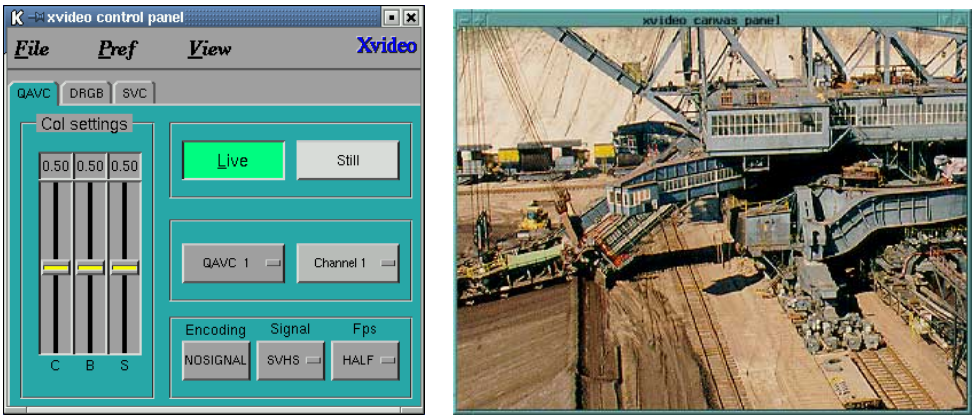


Figure 4-3
Xvideo client control and canvas panel

The video client offers up to three tabs for QUAD ANALOG VIDEO CARD, STREAMING VIDEO CARD and DUAL RGB INPUT CARD depending on the actual hardware configuration of your EOS.

The options for starting the video client `xvideo` are listed in section 4.6.5 The options. An important option is described below: Module Video and Module RGB.

Module video and Module RGB

All input cards allow to start the video client `xvideo` with an option for displaying the input signal without borders and fitted to complete projection modules (1 to n×n, depending on configuration).

The command

```
# xvideo –mv 1 –mg 1x1+1+0
```

lets the video client start as Module Video (`-mv 1`) on the second cube from the left in the upper row (`-mg 1x1+1+0`).

The displayed video or RGB signal is always »on top«, other applications are »beyond« and can not be manipulated by accident.

File menu

File	
Read Config File ...	Read configuration file
Save Config File ...	Save configuration file
Save Config File As ...	Save configuration file to another path and file name
Read Preset File ...	Read preset file
Save Preset File ...	Save preset file
Save Preset File As ...	Save preset file to another path and file name
Exit	Quit video client
Pref	
Save After Exit	Save/not save configuration on quitting the video client
Canvas Pref ...	Define position and size of Canvas Panel
RGB Pref ...	
Set Remote Display	Opens a dialag to enter IP address and screen number of the screen that is connected to the current RGB channel
On/Off Remote Pointer	Switches the remote pointer ability of the above set screen on or off; i.e. the pointer of the Eos can be used to operate the screen, displayed by the RGB channel
Map/Unmap Remote Keyboard	Maps or unmaps the remote keyboard; i.e. the keyboard of the Eos can be used to operate the screen, displayed by the RGB channel (it is also switched to the country scheme of the keyboard)
SVC Pref ...	
Stream Settings	Define settings of video streams
Board Settings	Define settings of a STREAMING VIDEO CARD
View	
Close Canvas Panel	Close canvas panel
Iconify Canvas Panel	Iconify canvas panel
Raise Canvas Panel	Raise canvas panel
Close Control Panel	Close control panel
Help	Display help in canvas panel

Table 4-4

A left mouse click in the canvas panel raises the control panel, another click dismisses it.

If no signal is connected to a video channel, the corresponding video window appears in background color. If a signal is connected later, the Channel, Port or Live button must be pressed.

4.6.4 Displaying video and RGB signals

Control panel for Quad Analog Video Card

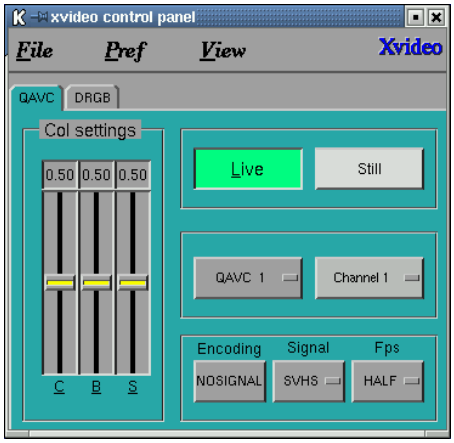


Figure 4-4
Xvideo control panel

C	Set contrast of video display
B	Set brightness of video display
S	Set saturation of video display
Live	Start video display
Still	Freeze video display
QAVC 1	Select video card (the cards can be renamed)
Channel 1	Select video channel (max. 4 channels; the channels can be renamed)
Encoding	Shows the detected video standard (PAL, NTSC, SECAM)
Signal	Select recording standard (VHS, S-VHS)
Fps	Select the frame rate (FULL, HALF - default)

Figure 4-5

Configuration of the video display

In the Control Panel you can adjust the video display regarding hue, saturation and brightness etc.

The video client can store these settings as well as the selected video channel in a configuration file. From the **File** menu you can choose to save the current configuration or read in other.

A certain configuration file can also be invoked as an option on the command line when starting the video client. Please, refer to section 4.6.5 The options.

Control Panel for Streaming Video Card

Figure 4-6
Xvideo control panel

C	Set contrast of video display
B	Set brightness of video display
S	Set saturation of video display
Live	Start video display
Still	Freeze video display
SVC 1	Select video card (the cards can be renamed)
Channel 1	Select video channel of the STREAMING VIDEO CARD (max. 4 channels; the channels can be renamed)
Stream	Assign a video stream to the selected Channel, please refer also to section Configuring Streaming Video Card and Configuring video streams below
Encoding	Shows the detected video standard (PAL, NTSC)
Fps	Select the frame rate (FULL, HALF - default)

Table 4-5

Configuring Streaming Video Card

For each STREAMING VIDEO CARD once the configuration parameters must be entered into the **SVC Settings** dialog, therefore select **SVC Pref ... -> Board Settings** from the **File** menu; please refer to section 4.6.3 The Xvideo client.

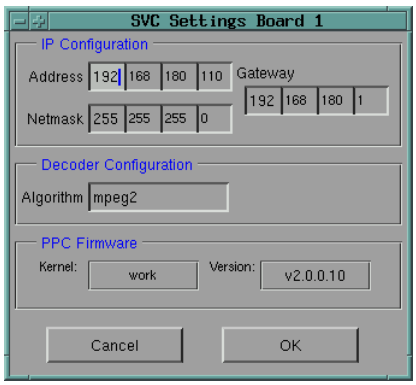


Figure 4-7
SVC Settings dialog of the STREAMING VIDEO CARD

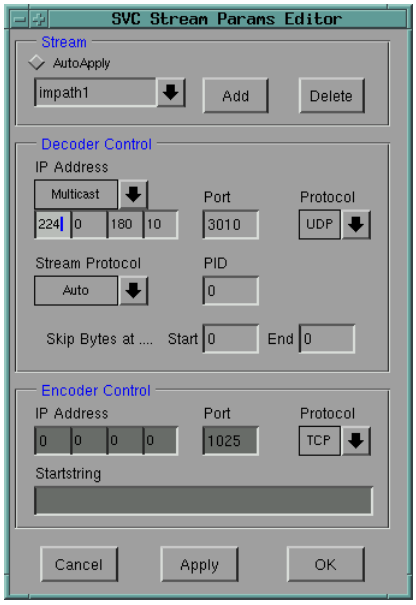
IP Configuration	
Address	IP address of the STREAMING VIDEO CARD. Each STREAMING VIDEO CARD needs its own, fixed IP address
Netmask	Netmask of the STREAMING VIDEO CARD, must be the same value for all cards
Gateway	Gateway, must be the same value for all cards. Even if the network does not require an indication of the Gateway, a value must be filled in.
Decoder Configuration	
Algorithm	All video streams processed by one STREAMING VIDEO CARD must have the same compression algorithem. Currently **mpeg2** and **visiowave** is supported

Table 4-6

Configuring video streams

The parameters of a video stream must be defined in the **SVC Stream Params Editor**, before the STREAMING VIDEO CARD can display it. Once defined it is available for every STREAMING VIDEO CARD in the system. To open the **SVC Stream Params Editor** select **SVC Pref ... -> Stream Settings** from the **File** menu, please refer to section 4.6.3 The Xvideo client.

Pressing the **Add** button adds a new stream with the entered name into the **Streams** list. The parameters that are displayed at that time are saved together with it. If there exists already an entry with the same name then its parameters are not changed. Pressing the **Apply** button applies the displayed parameters to the hardware. In that way changes can be controlled directly. Pressing the **OK** button applies the parameters to the hardware and to the system. Pressing the **Cancel** button closes the window, anyhow changes that are already confirmed with the **Add** or **Delete** button can not be revoked.



Stream	A list of all video streams in alphabetic order	
Decoder Control		
IP Address	select the type of stream (**unicast**, **broadcast** or **multicast**) when **multicast** is selected also the multicast IP address must be specified	
Port	Encoder port, appendant to the IP address.	
IP Portocol	Selection of the used IP protocol. (firmware < 2.0 of the STREAMING VIDEO CARD only supports **UDP**)	
Stream Protocol	**auto**	Auto-detection of the stream protocol
	elementary	Elementary stream
	program	Program stream
	transport	Transport stream
PID	Should be entered for transport streams when the PAT (program allocation tables) or PMT (program map tables) are not sent. **0** is a predefined value. It causes an auto-search for the video PID. If no valid PID is found no video will be shown.	
Skip bytes at ...		
Start **End**	Encoder dependant value of the number of bytes that must be skipped at the beginning / end of each packet, please see table below.	

Encoder Control	This section contains data that is used, if initial communication with the encoder is needed to prompt the encoder to send a stream. All fields must be filled in!
IP Address	IP address of the encoder; may only be filled in if **TCP** has been selected for **IP Protocol**
Port	Port where the encoder listens to TCP start commands; may only be filled in if **TCP** has been selected for **IP Protocol**
IP Protocol	Should remain **udp**, as indicated in the section **Decoder control** above. Only if a communication with the encoder is required, **tcp** should be selected.
Startstring	String that is sent to the specified encoder

Figure 4-8
Parameters on the SVC Stream Params Editor

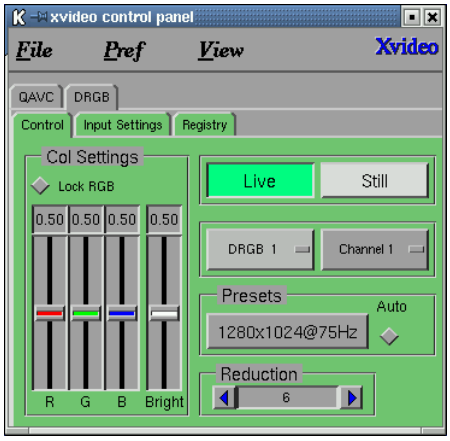
As unicast streams are only sent to one single IP address, only one Streaming Video Card at a time is able to display one particular unicast stream.

The following table lists the encoder specific values that must be entered into the **SVC Stream Params Editor**.

Encoder	IP Protocol	Skip bytes at Start ...	Skip bytes at End ...	Stream type	TCP	PID
VCS VideoJet 1000						
firmware < 2.0	**UDP**	**16**	**0**	**auto**	**Off**	**0**
	Display stamping (including Time, Stamping, Time Stamping, ...) is used					
firmware ≥ 2.0	**RTP**	**4**	**0**	**auto**	**Off**	**0**
	Display stamping (including Time, Stamping, Time Stamping, ...) may not be used					
Vbrick 4000	**UDP**	**0**	**0**	**auto**	**Off**	**0**
	The encoder setting Low Latency should not be used; if there are big changes in the video image a green flash will appear at the bottom side of the video.					
IMPath I-Volution 4000	**UDP**	**0**	**0**	**auto**	**Off**	**0**
NKFC-20						
firmware < 2.0	**UDP**	**28**	**0**	**auto**	**Off**	**256**
firmware ≥ 2.0	**RTP**	**0**	**0**	**auto**	**Off**	**256**
Visiowave						
firmware ≥ 2.0	**UDP**	**0**	**0**	**auto**	**ON**	**0**
	Use »visiowave« as startstring and specify also the other entries in the section Encoder Control!					

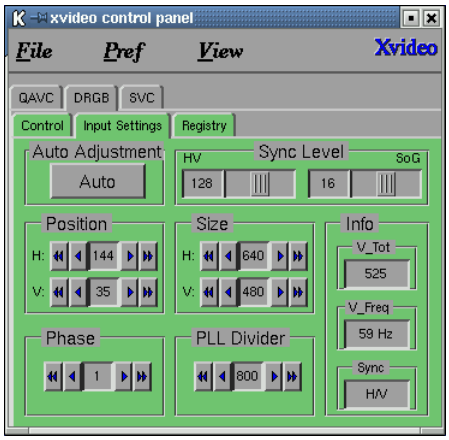
Table 4-7
Encoder dependant parameter values

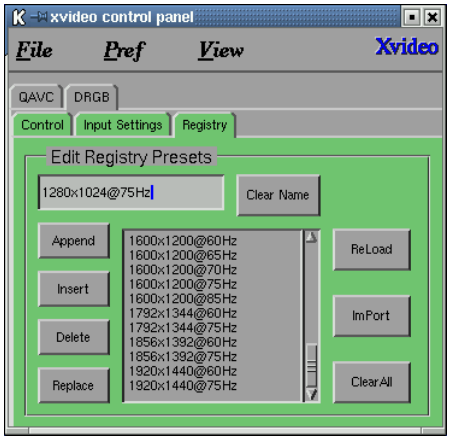
Control panel for Dual RGB Input Card



Control	
R	Intensity of red component
G	Intensity of green component
B	Intensity of blue component
Lock RGB	Change red, green and blue component together
Bright	Brightness of display
Live	Start the RGB display.
Still	Freeze the RGB display.
DRGB 1	Select one DUAL RGB INPUT CARD (the cards can be renamed)
Channel 1	Select video channel of the DUAL RGB INPUT CARD (max. 2 channels; the channels can be renamed)
Presets	Select a timing (current timing is indicated in the button)
Auto	Activate auto-detect of source settings
Reduction	Set the dynamic reduction factor of the frame rate; range (0, 1, 2, ... , 15) The static frame rate reduction, determined by the input mode (please refer to section 4.6.1 The input cards (Dual RGB Input Card) can additionally be reduced by this factor 0: sets dynamic part of frame rate reduction to 1, best quality; 4: sets dynamic part of frame rate reduction to 1/2; 6: sets dynamic part of frame rate reduction to 1/3; 15: sets dynamic part of frame rate reduction to 1/15, best performance

Figure 4-9
Xvideo control panel





Input Settings	
Auto	Auto adjustment of source
Sync Level	Determine the sync level of the signal HV: tuning the horizontal/vertical sync level SoG: tuning the Sync on Green level
Position	Position display area of visible RGB signal in the Canvas Panel H: horizontal position of first active pixel (in steps of two) V: vertical position of first active line
Size	Determine size of visible RGB signal H: number of active pixels per line (in steps of four) V: number of active lines
Phase	Tune phase shift of ADC
PLL Devider	Determine pixel frequency of RGB input
Info	Information about input signal V_Tot: number of lines V_Freq: frame rate Sync: mode of synchronization
Registry	
Clear Name	Clear text box, which displays name of current preset
Append	Current setting is added to the list of presets
Insert	Current setting is inserted in the list of presets (before the highlighted preset)
Replace	Replace highlighted preset by current setting
Delete	Delete highlighted preset
Clear all	Delete all listed presets
Save	Save all listed presets in preset file
Reload	Reload preset file and discard changes
Import	
Add	Add all highlighted presets to list of presets
Clear Select	Clear selection
Dismiss	Dismiss dialog box

Figure 4-10

If the applied signal changes while adjusting the settings, then a warning message apears, please see below. You can change to the contol tab and select an appropriate timing for the new signal (click YES).

It is also possible, that the system detects a new timing, if the settings have been displaced too much. In this case click NO and readjust the settings again.

Configuration of RGB input

The DUAL RGB INPUT CARD digitizes monitor signals with a pixel frequency to 270 MHz. The video client is pre-configured for displaying most common VESA-timings.

Since most monitor signals differ slightly from the VESA-timings, the user can adjust the pre-configured modes to the provided monitor signals. Also additional timings can be entered and stored as new presets.

For configuring the DUAL RGB INPUT CARD it is useful to have a suitable test pattern, basically thin black and white vertical lines:

Windows 95/98/NT, Macintosh, PowerMacintosh	Switch desktop pattern to alternating, one pixel wide, black and white vertical lines
Sun Workstation	In console window (**`cmdtool`**) enter **`xsetroot -mod 4 4`**, (enter **`xsetroot -mod 4 4`** for removing the pattern again)
Others	Display text, which contains many **HHHHHHH**.

Table 4-8

Adjusting the preset

- Set up a suitable test pattern on the connected computer.
- Start the video client `xvideo`.
- Select the input channel in the **Control** tab (**Channel 1** or **Channel 2**).

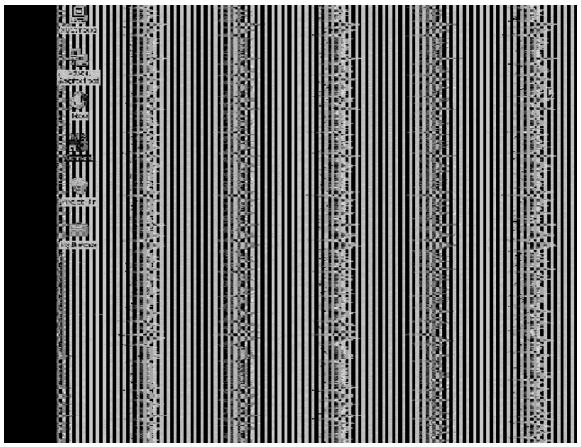


Figure 4-11
Configuring RGB input

- Switch to the **Input Settings** tab and press **Auto**. This will automatically detect the source and set the right preset.
- If necessary switch to the **Input Settings** tab and tune **PLL Devider** (approx. 1.3 × horizontal size) until the test pattern is displayed correctly.
- Align the display within the window with **Position**.
- If necessary tune **Phase** until the test pattern is displayed without flicker.

Managing the presets

As already mentioned a set of presets is pre-configured in the video client. These presets are stored in a preset file. The current preset file can be modified in the **Registry** tab, i. e. you can replace an existing timing by your own settings or add these to the list of timings.

The video client can handle more than one preset file. From the **File** menu you can choose to save the current preset file or read in another.

A certain preset file can also be invoked as an option on the command line when starting the video client. Please, refer to section 4.6.5 The options.

Configuration of the RGB display

Back in the **Control** tab you can adjust the RGB display regarding hue, saturation and brightness etc.

The video client can store these settings as well as the selected RGB channel and preset in a configuration file. From the **File** menu you can choose to save the current configuration or read in other.

A certain configuration file can also be invoked as an option on the command line when starting the video client. Please, refer to section 4.6.5 The options.

4.6.5 The options

The video client accepts the following options on the command line. The **options** are listed together with their respective **arguments** and **default** values, and a short description.

Options concerning control panel

option	argument meaning	default
-name	string changes application name and allows to specify a certain resource file	none
-display	string specifies remote host	$DISPLAY
-ctrlTitle **-clt**	string determines the window title of the xvideo control panel	xvideo control panel
-ctrlGeom **-clg**	geometry specifies position and size of the xvideo control panel	+50+100
-ctrlVisible **-clv**	0, 1 shows (1) or hides (0) the xvideo control panel	1
-ctrlIconic **-cli**	0, 1 iconifies (1) or resizes (0) the control panel	0
-followMouse **-fm**	0, 1 starts the control panel at the standard position (0) or at the position of the mouse pointer (1)	1
-activeGrabber **–ag**	3, 5, 7 selects QUAD ANALOG VIDEO CARD (3), DUAL RGB INPUT CARD (5), or STREAMING VIDEO CARD (7)	

Table 4-9

Options concerning canvas panel

option	argument meaning	default
-canvasDisplay **-cvd**	string specifies another remote host for video display	same as –display or $DISPLAY
-canvasTitle **-cvt**	string determines the window title of the canvas panel	xvideo canvas panel
-canvasGeom **-cvg**	geometry specifies position and size of the canvas panel	768x576+450+100
-canvasBackground **–cvbg**	color name Specifies the background color of the canvas panel. To specify a color a name defined in the file rgb.txt in the folder usr/X11RELEASE6/lib/X11/rgb.txt must be used.	blue
-canvasIconic **-cvi**	0, 1 iconifies (1) or resizes (0) the canvas panel	0
-allowResize **-ar**	0, 1 enables (1) interactive resizing of the canvas panel	1
-ratioAspect **-ra**	0, 1 restricts (1) re-sizing of the canvas panel to constant ratio of width and height of the video	1
-winRatioAspect **-cvwa**	0, 1 restricts (1) re-sizing of the canvas panel to constant ratio of width and height of the window	0
-noBorder **-nb**	0, 1 starts the canvas panel with (0) or without (1) border	0

Table 4-10

Options concerning Quad Analog Video Card

option	argument meaning	default
-qavRecording **–qavre**	VHS, SVHS selects the recording standard	VHS
-qavRefreshRate **–qavrr**	1, 2 selects full (2) or half (1) refresh rate	1
-qavContrast **–qavco**	0.0 .. 1.0 determines the start value of contrast	0.5
-qavBrightness **-qavbr**	0.0 .. 1.0 determines the start value of brightness	0.5
-qavSaturation **–qavsa**	0.0 .. 1.0 determines the start value of saturation	0.5
-qavBoardNumber **–qavbn**	1 .. 32 selects the video card	1
-qavBoardChannelNumber **–qavbc**	1..4 selects the video adapter on the card	1
-qavPlayMode **-qavpm**	Live, Still selects display mode	Live

Table 4-11

Options concerning Streaming Video Card

option	argument meaning	default
-mpgBoardNumber **–mpgbn**	1 .. 32 selects the video card	1
-mpgBoardChannelNumber **–mpgbc**	1..4 selects the video channel on the card	1
-mpgPresetName **–mpgpn**	filename selects a streaming video preset by specifying the presets name	impath1
-mpgPreset **–mpgpr**	1..n selects a streaming video preset by specifying the number that represents its order in the alphabetic list of all streaming video presets	
-mpgRefreshRate **–mpgrr**	1, 2 selects full (2) or half (1) refresh rate	1
-mpgContrast **–mpgco**	0.0 .. 1.0 determines the start value of contrast	0.5
-mpgBrightness **-mpgbr**	0.0 .. 1.0 determines the start value of brightness	0.5
-mpgSaturation **–mpgsa**	0.0 .. 1.0 determines the start value of saturation	0.5
-mpgPlayMode **-mpgpm**	Live, Still select display mode	Live

Table 4-12

Options concerning Dual RGB Input Card

option	argument meaning	default
-drgbRed **–drgbre**	0.0 .. 1.0 determines the start value of red	0.5
-drgbGreen **–drgbgr**	0.0 .. 1.0 determines the start value of green	0.5
-drgbBlue **–drgbbl**	0.0 .. 1.0 determines the start value of blue	0.5
-drgbBrightness **–drgbbr**	0.0 .. 1.0 determine the start value of brightness	0.5
-drgbReduction **-drgbrd**	0 .. 15 determine the reduction rate	6
-drgbPreset **-drgbpr**	1 .. n Determine preset as line number in preset file	1
-drgbBoardNumber **–drgbbn**	1 .. 64 selects the input card	1
-drgbBoardChannelNumber **–drgbbc**	1, 2 selects the adapter on the input card	1
-drgbPlayMode **-drpm**	Live, Still select display mode	Live

Table 4-13

Options concerning config and preset files

option	argument meaning	default
-configFile **-cf**	<filename> specifies user configuration file	/etc/MMTconfig/xvideo.conf
-noConfigFile **-ncf**	user configuration file will not be read	
-presetFile **-pf**	<filename> specifies preset file	/etc/MMTconfig/presets.prf
-factoryPresetFile **-fpf**	<filename> specifies factory preset file, see Table 7-9 (read if no other preset file is specified).	/opt/MMT2686/etc/xvideo/presets.prs

Table 4-14

Options concerning module video and module RGB

option	argument meaning	default
-moduleVideo **-mv**	0, 1 (1) video is displayed as Module Video, RGB signals as Module RGB	0
-moduleGeometry **-mg**	geometry determines layout of Module Video and Module RGB	

Table 4-15

X.11 window geometry

The `geometry` variable of an X.11 window specifies its size and its placement on the screen. The `geometry`, specified with the geometry resource, has the form:

```
<w>x<h>+<xoff>+<yoff>
```

Here `w` and `h` give the width and height of the window, measured in pixels. The values `xoff` and `yoff` give the offset in pixels from the screen's left edge and top edge respectively. If the '+' preceding is replaced by '-', `xoff` and `yoff` give the offset of the screen's right edge or bottom edge. For example:

`300x400+200+100`
width: 300 pixel, height: 400 pixel
top left corner positioned at x=200, y=100
relative to the top left corner of the screen;

`300x400`
width: 300 pixel, height: 400 pixel
position not specified;

`300x400-200+100`
width: 300 pixel, height: 400 pixel
top right corner positioned at x=200, y=100
relative to the top right corner of the screen;

`300x400-200-100`
width: 300 pixel, height: 400 pixel
bottom right corner positioned at x=200, y=100
relative to the bottom right corner of the screen.

You can omit any of the elements in the geometry specification (e. g., the position in `-canvasGeom 300x400`). The window manager – a special client controlling the layout of the windows – will use default values for the missing elements.

Example for –canvasDisplay

The canvas and control panel can be displayed on different desktops. The control panel can be directed to any host computer with the option `–display`. In this case, the canvas panel can be directed to Eos with the option `–canvasDisplay`.

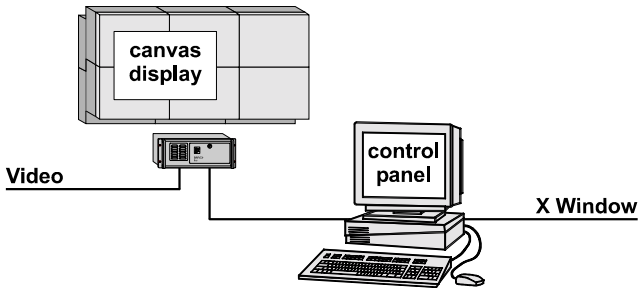


Figure 4-12
Redirected control panel

4.6.6 The resource files

You can adjust the behavior of an X client by providing options on the command line when you call it. These options specify the values of certain attributes of clients called resources. In addition, you can place specifications that establish defaults for resources in resource files.

The concept of resource files is complex and therefore only the basics necessary for fundamental understanding can be treated here.

Further documentation

A detailed and complete description can be found in:

- **X Window System User's Guide - Volume 3**
  Valerie Quercia, Tim O'Reilly
  O'Reilly & Associates, January 1993
  ISBN: 1565920155

Syntax

The **resource** syntax knows **loose binding** and **tight binding**:

`name*variable:value`	loose binding
`name.variable:value`	tight binding

Table 4-16

The **loose binding**:

```
xvideo*title:my video
```

determines both the title of the **control panel** and the title of the **canvas panel**. Whereas the **tight binding**:

```
xvideo.ctrl.title:my xvideo control panel
xvideo.canvas.title:my xvideo canvas panel
```

determines the titles of control and canvas panel separately.

-name option

The `xforms` toolkit option `-name` allows to control which resource is evaluated when starting `xvideo`. So, if two different **resources** for `foo` and for `dummy` are defined:

```
xvideo-foo.ctrl.title:foo control panel
xvideo-foo.canvas.title:foo control panel

xvideo-dummy.ctrl.title: dummy control panel
xvideo-dummy.canvas.title: dummy control panel
```

`xvideo` can be started two times with different settings:

```
eos:/root # xvideo -name xvideo-foo
eos:/root # xvideo -name xvideo-dummy
```

Classes

An important component of the resource concept are **classes**. The `xvideo` client belongs to the `XVideo` class. Indeed all mentioned resources belong to this class.

This way, it is possible to define settings, which effect all `xvideo` clients. E. g.,

```
XVideo*encoding:PAL
XVideo*recording:VHS
```

is evaluated by both clients `xvideo-foo` and `xvideo-dummy` concerning the example above.

Path of resource files

The resources are stored in **resource files**. These files must be located in certain directories and must be named correctly.

These paths and variables are evaluated in this sequence:

- `/usr/lib/X11/app-defaults/XVideo`
- `$XAPPRLESDIR/XVideo`
- `RESOURCE_MANAGER` or if empty: `~/.Xdefaults`
- `$XENVIRONMENT` or if empty: `~/.Xdefaults-<hostname>`
- options on the command line

Resources of the XVideo class concerning the control panel

option	argument meaning	default
ctrl.title	string see option -ctrlTitle above	xvideo control panel
ctrl.geometry	string see option -ctrlGeom above	+50+100
ctrl.visible	bool see option -ctrlVisible above	true
ctrl.iconic	bool see option -ctrlIconic above	false
followMouse	bool see option -followMouse above	true

Table 4-17

Resources of the XVideo class concerning the canvas panel

option	argument meaning	default
canvas.display	string see option –canvasDisplay above	$DISPLAY
canvas.title	string see option -canvasTitle above	xvideo canvas panel
canvas.geometry	string see option -canvasGeom above	768x576+450+100
canvas.iconic	bool see option -canvasIconic above	false
canvas.maxSize	string allows to limit the maximum size of the canvas panel, 0x0 is unlimited	0x0
canvas.minSize	string allows to limit the min. size of the canvas panel, 0x0 is unlimited	0x0
canvas.ratioAspect	bool see option -ratioAspect above	true
canvas.AllowResize	bool see option -allowResize above	true
canvas.noBorder	bool see option -noBorder above	false
canvas.backGround	bool see option –canvasBackground above	blue

Table 4-18

Resources of the XVideo class concerning module video and module RGB

option	argument meaning	default
moduleVideo	geometry see option -moduleVideo above	
moduleGeometry	geometry see option -moduleGeometry above	

Table 4-19

Resources of the XVideo class concerning the Quad Analog Video Card

qav.recording	string see option –qavRecording above	VHS
qav.RefreshRate	int see option –qavRefreshRate above	1
qav.contrast	double see option -qavContrast above	0.5
qav.brightness	double see option -qavBrightness above	0.5
qav.saturation	double see option –qavSaturation above	0.5
qav.boardMenu	string Sets the names of the video card appearing in the video cards menu. 32 names, each 12 characters, separated by '|' are allowed. First name matches first video card and so on.	QAVC 1|QAVC 2|QAVC 3|...
qav.boardNumber	int see option -qavBoardNumber above	1
qav.boardChannelMenu1	string Sets the names of the adapters of the first video card appearing in the channel menu. 4 names, each 12 characters, separated by '|' are allowed. First name matches first adapter and so on.	Channel 1|Channel 2|Channel 3| Channel 4
...		
qav.boardChannelMenu32	string Sets the names of the adapters of the 32th video card appearing in the channel menu. 4 names, each 12 characters, separated by '|' are allowed. First name matches first adapter and so on.	Channel 1|Channel 2|Channel 3| Channel 4
qav.boardChannelNumber	int see option -qavBoardChannelNumber above	1
qav.playMode	string see option -qavPlayMode above	Live

Table 4-20

Resources of the XVideo class concerning the Streaming Video Card

mpg.refreshRate	int	1
	see option –mpgRefreshRate above	
mpg.contrast	double	0.5
	see option -mpgContrast above	
mpg.brightness	double	0.5
	see option -mpgBrightness above	
mpg.saturation	double	0.5
	see option –mpgSaturation above	
mpg.boardMenu	string	SVC 1|SVC 2|SVC 3|...
	Sets the names of the video card appearing in the video cards menu. 32 names, each 12 characters, separated by '|' are allowed. First name matches first video card and so on.	
mpg.boardNumber	int	1
	see option -mpgBoardNumber above	
mpg.boardChannelMenu1	string	Channel 1|Channel 2|Channel 3| Channel 4
	Sets the names of the video channels of the first video card appearing in the channel menu. 4 names, each 12 characters, separated by '|' are allowed. First name matches first adapter and so on.	
...		
mpg.boardChannelMenu32	string	Channel 1|Channel 2|Channel 3| Channel 4
	Sets the names of the video channels of the 32th video card appearing in the channel menu. 4 names, each 12 characters, separated by '|' are allowed. First name matches first adapter and so on.	
mpg.boardChannelNumber	int	1
	see option -mpgBoardChannelNumber above	
mpg.playMode	string	Live
	see option -mpgPlayMode above	
mpg.preset	int	1
	see option -mpgPreset above	
mpg.presetName	string	
	see option -mpgPresetName above	

Table 4-21

Resources of the XVideo class concerning config and preset files

option	argument meaning	default
configFile	<filename>	/etc/MMTconfig/xvideo.conf
	see option -configFile above	
noConfigFile		
	see option -noConfigFile above	
presetFile	<filename>	/etc/MMTconfig/presets.prf
	see option -presetFile above	
factoryPresetFile	<filename>	/opt/MMT2686/etc/xvideo/presets.prs
	see option -factoryPresetFile above	

Table 4-22

Resources of the XVideo class concerning the Dual RGB Input Card

option	argument meaning	default
drgb.red	0.0 .. 1.0 see option -drgbRed above	0.5
drgb.green	0.0 .. 1.0 see option -drgbGreen above	0.5
drgb.blue	0.0 .. 1.0 see option -drgbBlue above	0.5
drgb.brightness	0.0 .. 1.0 see option -drgbBrightness above	0.5
drgb.reduction	0 .. 15 see option -drgbReduction above	6
drgb.preset	1 .. n see option -drgbPreset above	1
drgb.boardMenu	string Sets the names of the video card appearing in the video cards menu. 64 names, each 12 characters, separated by '|' are allowed. First name matches first video card and so on.	DRGB 1|DRGB 2|DRGB 3|...
drgb.boardNumber	int see option –drgbBoardNumber above	1
drgb.boardChannelMenu1 ... **drgb.boardChannelMenu64**	string Sets the names of the adapters of the first video card appearing in the channel menu. 2 names, each 12 characters, separated by '|' are allowed. First name matches first adapter and so on. string Sets the names of the adapters of the 64th video card appearing in the channel menu. 2 names, each 12 characters, separated by '|' are allowed. First name matches first adapter and so on.	Channel 1|Channel 2 Channel 1|Channel 2
drgb.boardChannelNumber	int see option -drgbBoardChannelNumber above	
drgb.playMode	string see option -drgbPlayMode above	Live

Table 4-23

4.7 Remote-Control for OverView display walls

An OverView display wall can be controlled by Eos. Commands can be sent to switch the lamps and analog video controllers on and off, or the status of the illumination units can be scanned.

The Remote-Control can also be used for monitoring Eos. It's operating status can be scanned and if necessary it can be halted or rebooted.

Alternatively the additional wall management software Osiris offers as well the functionality of a remote control, for the Osiris users manual see section 7.3 Order codes.

4.7.1 The Remote-Control daemon

The REMOTE-CONTROL is implemented in a client/server architecture. The REMOTE-CONTROL **daemon** is the central authority (server), that connects the REMOTE-CONTROL **clients** with the serial interface.

Four different REMOTE-CONTROL clients are available:

- **Monitor**
  This service sets up a software based monitoring function. EOS is rebooted automatically after absence of specific monitor telegrams.
- **Service**
  This service includes the possibilities to halt or to restart the X server or to shut down or to reboot EOS.
- OVERVIEW
  The cubes of an OVERVIEW display wall (OVERVIEW-ML, OVERVIEW-MD, OVERVIEW-MP, ATLAS67C4-PSI) can be scanned and switched.
- **Switch**
  The AVC-BOXES, HERMES V2A, HERMES VXA, DIGITAL SWITCHBOXES, HERMES D2D and HERMES DXD can be scanned and switched. If available, the video controller can be operated.

Starting the daemon

The REMOTE-CONTROL daemon is started automatically on system start with the script:

```
/sbin/init.d/rc2.d/S96rcrld
```

Following options are available:

Option	argument meaning	default
`-a`		**auto configuration** active
	Deactivates **auto configuration** of the REMOTE-CONTROL chain, i. e. the automatic addressing of all connected devices having no address assigned.	
`-r`		**reconfiguration** active
	Deactivates automatic **reconfiguration**, i. e. the reconfiguration of the REMOTE-CONTROL chain on start up of the daemon.	
`-p`	`<port>`	`13579`
	Specifies the port of the daemon. (Default should not be changed!)	
`-l`	`<msec>`	`200`
	Specifies delay time in milliseconds for sending messages (OVERVIEW-ML)	
`-d`	`<msec>`	`20`
	Specifies delay time in milliseconds for sending messages (OVERVIEW-MD, OVERVIEW-MP, ATLAS67C4-PSI, AVC-BOX, HERMES V2A, DIGITAL SWITCHBOX, HERMES D2D)	

Table 4-24

4.7.2 The Remote-Control clients (command line based)

In accordance with the offered services of the REMOTE-CONTROL daemon there are clients which use these services. Different clients can use the same service simultaneously.

rctrlmon

The monitor client `rctrlmon` monitors the connection between client (on host computer) and daemon (on Eos). For this purpose, the client sends periodically keep-alive-telegrams for the daemon. The daemon boots Eos after absence of the telegrams.

The `rctrlmon` client can be started as follows:

`rctrlmon [-<option>]`

Following options are available:

option	argument meaning	default
`-h`	`<hostname>` Specifies hostname or IP address, where the daemon is started.	`local host`
`-p`	`<port>` Specifies port of the `rcrld` daemon. (Default should not be changed!)	`13579`
`-i`	`<KeepAliveIntervall>` Specifies the period between two keep-alive-telegrams.	`5 sec`
`-r`	`<KeepAliveRetries>` Specifies the maximum number of missing telegrams, after which the daemon reboots Eos.	`10`

Table 4-25

rctrlservice

The service client `rctrlservice` can be operated interactively or command-by-command.

The `rctrlservice` client can be started as follows:

`rctrlservice [-<option>]`

Following options are available:

option	argument meaning	default
`-h`	`<hostname>` Specifies hostname or IP address, where the daemon is started.	`local host`
`-p`	`<port>` Specifies port of the `rcrld` daemon. (Default should not be changed!)	`13579`
`-e`	`<exec command>` Specifies desired command.	

Table 4-26

The `rctrlservice` client accepts following commands:

command	meaning
`restartxserv`	Restarting X Server
`stopxserv`	Halting X Server
`shutdownmmt`	Rebooting Eos
`haltmmt`	Halting Eos
`help`	Returning a list and short descriptions of all available commands.
`exit`	Exits the client.

Table 4-27

If the client is operated interactively it prompts `rctrlservice>>`. The commands can be shortened by unambiguous short cuts.

rctrlleg

The OverView-mL client `rctrlleg` can be operated interactively or command-by-command.

The client `rctrlleg` can be started as follows:

`rctrlleg [-<option>]`

Following options are available:

option	argument meaning	default
`-h`	`<hostname>` Specifies hostname or IP address, where the daemon is started.	`local host`
`-p`	`<port>` Specifies port of the `rcrld` daemon. (Default should not be changed!)	`13579`
`-e`	`<exec command>` Specifies desired command.	

Table 4-28

The client accepts following commands:

command	meaning
`bulb <number>|all> <on|off>`	Switching off lamp
`aux <number>|all> <on|off>`	Switching to analog controller
`info <number>|all>`	Scanning status of OverView cube
`help`	Returning a list and short descriptions of all available commands
`exit`	Exits the client.

Table 4-29

If the client is operated interactively it prompts `rctrlleg>>`. The commands can be shortened by unambiguous short cuts.

rctrldlp

The OverView-mD client `rctrldlp` can be operated interactively or command-by-command.

The client `rctrldlp` can be started as follows:

`rctrldlp [-<option>]`

Following options are available:

option	argument meaning	default
`-h`	`<hostname>` Specifies hostname or IP address, where the daemon is started.	`local host`
`-p`	`<port>` Specifies port of the `rcrld` daemon. (Default should not be changed!)	`13579`
`-e`	`<exec command>` Specifies desired command.	
`-b`	 Switch off broadcast mode.	

Table 4-30

The client accepts following commands:

command	meaning
`?`	Returns a list and short descriptions of all available commands
`help`	Returns a list and short descriptions of all available commands
`enable`	Activate **auto config** mode
`disable`	Deactivate **auto config** mode
`reconfig`	Invoke **reconfiguration**
`bulb <number|all> ↳ <on|off>`	Switch lamp on/off
`info <number|all>`	Scan status of OverView cube
`restime`	Reset operating hours to zero.
`version`	Get version number
`exit`	Exits the client.

Table 4-31

If the client is operated interactively it prompts `rctrldlp>>`. The commands can be shortened by unambiguous short cuts.

rctrlpsi

The OverView-mP or Atlas67C4-PSI client `rctrlpsi` can be operated interactively or command-by-command.

The client `rctrlpsi` can be started as follows:

`rctrlpsi [-<option>]`

Following options are available:

option	argument meaning	default
`-h`	`<hostname>` Specifies hostname or IP address, where the daemon is started.	`local host`
`-p`	`<port>` Specifies port of the `rcrld` daemon. (Default should not be changed!)	`13579`
`-e`	`<exec command>` Specifies desired command.	
`-s`	 Starting client in special mode for (re-)setting operation hours.	

Table 4-32

The client accepts following commands:

command	meaning
`?`	Returns a list and short descriptions of all available commands
`help`	Returns a list and short descriptions of all available commands
`enable`	Activate **auto config** mode
`disable`	Deactivate **auto config** mode
`reconfig`	Invoke **reconfiguration**
`bulb <number|all> ↳ <on|off>`	Switch lamp on/off
`info <number|all>`	Scan status of OverView cube
`restime`	Reset operating hours to zero.
`version`	Get version number
`exit`	Exits the client.

Table 4-33

If the client is operated interactively it prompts `rctrldlp>>`. The commands can be shortened by unambiguous short cuts.

rctrlswitch

The client `rctrlswitch` can be operated interactively or command-by-command.

The client `rctrlswitch` can be started as follows:

`rctrlswitch [-<option>]`

Following options are available:

option	argument meaning	default
`-h`	`<hostname>` Specifies hostname or IP address, where the daemon is started.	`local host`
`-p`	`<port>` Specifies port of the `rcrld` daemon. (Default should not be changed!)	`13579`
`-e`	`<exec command>` Specifies desired command.	

Table 4-34

The `rctrlswitch` client accepts following commands:

command	meaning
`enable`	activating **auto config** mode
`disable`	deactivating **auto config** mode
`reconfig`	invoking **reconfiguration**
`aux <ctrl number|all> <on|off>`	switching between different inputs
`switch <ctrl number|all>` **`↳ <input,output>`**	assigning input to output channels (HERMES DXD and HERMES VXA only) input and output can either be indicated in the form e.g. **`1,2`** or **`2,2`** or a shortcut can be used: **`thru`** or **`=`** In1 to Out 1, In2 to Out 2 **`cross`** or **`x`** In1 to Out 2, In2 to Out 1 **`1,both`** or **`1,b`** In1 to Out 1 and Out2 **`2,both`** or **`2,b`** In2 to Out 1 and Out2
`version <ctrl number|all>`	returning the version of the device
`help`	returning a list and short descriptions of all available commands
`exit`	Exits the client.

Table 4-35

Additionally, for an AVC-BOX, a HERMES V2A or a HERMES VXA, which is equipped with an analog controller for RGB or video signals following commands are available:

command	Meaning
`left <ctrl number>`	sending **left** command to analog controller
`right < ctrl number>`	sending **right** command to analog controller
`up <ctrl number>`	sending **up** command to analog controller
`down <ctrl number>`	sending **down** command to analog controller
`menu <ctrl number>`	sending **menu** command to analog controller
`enter < ctrl number>`	sending **enter** command to analog controller
`+ <ctrl number>`	sending **plus** command to analog controller (HERMES V2A and HERMES VXA only)
`- <ctrl number>`	sending **minus** command to analog controller (HERMES V2A and HERMES VXA only)

Table 4-36

If the client is operated interactively it prompts `rctrlswitch>>`. The commands can be abbreviated by unambiguous short cuts.

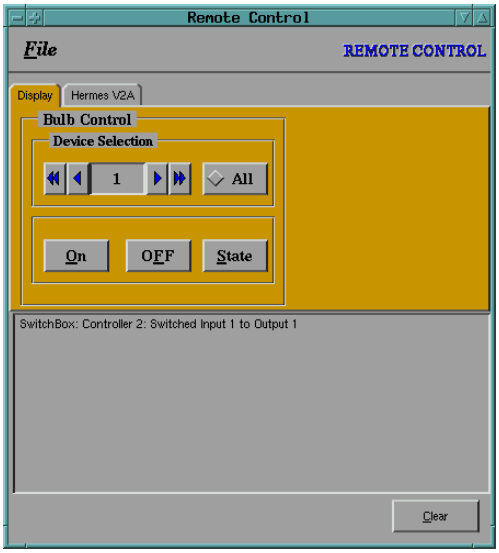
4.7.3 The GUI Remote-Control client

An OverView display wall and Digital Switchboxes (respective AVC-Boxes, Hermes V2A, Hermes D2D, Hermes VXA, Hermes VXD) can be controlled with the GUI Remote-Control client. The GUI Remote-Control client `rctrl` can be started as follows:

```
# rctrl [-<option>]
```

After `rctrl` is started (e. g. choose from menu following left click on root window) a **control panel** shows up offering a graphical user interface for controlling the OverView and Atlas cubes and the switchboxes.

Display



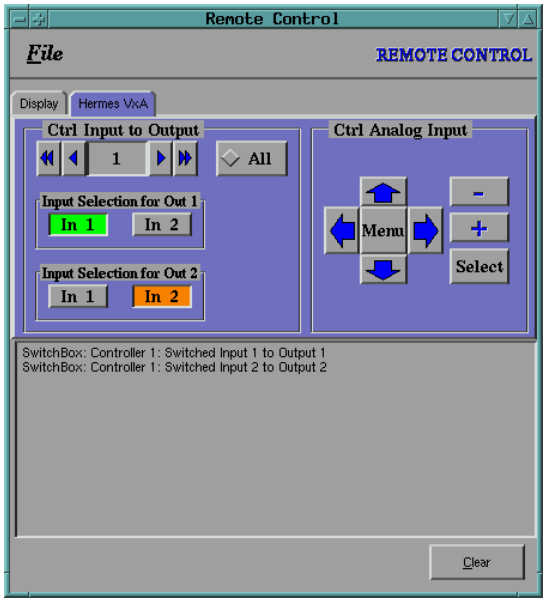
1	Single cubes can be specified by scrolling with the arrow buttons
All	Send respective command to all connected cubes
On	Switch on specified cube
Off	Switch off specified cube
State	Send a request to the specified cube. The reply is displayed in the status display below.
Clear	Clear the status display above
File: Exit	Exit the `rctrl` client

Figure 4-13

The Remote-Control daemon detects automatically which type of OverView display wall is connected to Eos. Initially the statuses of the connected cubes are displayed also automatically in the status display.

Be careful not to switch off the cube, that currently displays the control panel, because it would be difficult to switch it on again by Remote-Control!

Switch



1	A single unit can be specified by scrolling with the arrow buttons
All	Send respective command to all connected unit
In 1 for Out 1	Switch first output to first input
In 2 for Out 1	Switch first output to second input
Only applicable for HERMES DXD and HERMES VXA:	
In 1 for Out 2	Switch second output to first input (color code according to LEDs)
In 2 for Out 2	Switch second output to second input (color code according to LEDs)
AVC-BOX, HERMES V2A and HERMES VXA only:	
Left	Send **left** command to analog controller
Right	Send **right** command to analog controller
Up	Send **up** command to analog controller
Down	Send **down** command to analog controller
Menu	Send **menu** command to analog controller
Select	Send **enter** command to analog controller
+	Send **plus** command to analog controller (HERMES V2A only)
-	Send **minus** command to analog controller (HERMES V2A only)

Figure 4-14

Options

The `rctrl` client accepts the following options on the command line. The **options** are listed together with their respective **arguments** and **default** values and a short description of their **meaning**.

option	argument meaning	default
`-name`	`string` Changes application name and allows to specify a certain resource file.	none
`-display`	`string` Specifies remote host.	`$DISPLAY`
`-geometry`	`geometry` Specifies position and size of the `rctrl` control panel.	`+200+100`
`-h`	`<hostname>` Specifies hostname or IP address, where the `rctrl` daemon is started.	`Local host`
`-po` `-port`	`<port>` Specifies port of the `rcrld` daemon. (Default should not be changed!)	`13579`
`-e`	`0 | 1` Activates or deactivates automatic **reconfiguration**.	`0`
`-r`	 Invokes **reconfiguration**.	

Table 4-37

Refer to section 4.6.5 The options for a description of the `geometry` type in X.11, please.

Resources of the rctrl class

Refer to section 4.6.6 The resource files, please, for a description of the resources concept of X.11 including the respective path names. The name of the resource file itself must be `RCtrl` instead. A template for such a resource file is:

```
/opt/MMT2686/bin/linux/RCtrl
```

The following table lists all resources of the `rctrl` class:

option	argument meaning	default
`title`	`string` Determines the window title of the `rctrl` control panel.	REMOTE-CONTROL
`geometry`	`string` see option `–geometry` above	`+200+100`
`host`	`<hostname>` Specifies hostname or IP address, where the daemon is started.	`Local host`
`port`	`<port>` Specifies port of the `rcrld` daemon. (Default should not be changed!)	`13579`
`iconic`	`0, 1` Iconifies (`value=1`) or resizes (`value=0`) the `rctrl` control panel.	`0`
`avcEnableConfig`	`0 | 1` see option `–e` above	`0`
`avcReconfig`	`0 | 1` see option `–r` above	`0`

Table 4-38

4.7.4 Hot-keys

The commands for controlling the illumination units of an OverView display wall can be entered directly with hot-keys on the Eos keyboard.

hot-keys				meaning
Ctrl-left	Shift-left	<number of module>	**o**	Switching on lamp
Ctrl-left	Shift-left	<number of module>	**f**	Switching off lamp
Ctrl-left	Shift-left	<number of unit>	**a**	Switching to analog input/In 1
Ctrl-left	Shift-left	<number of unit>	**d**	Switching to digital input/In 2

Table 4-39

The keys **Ctrl-left** (left Control key) and **Shift-left** (left Shift key) must be pressed until the hot-key sequence is finished by entering the number of the respective projection module and the desired command.

In the configuration file of Eos the hot-keys can be re-configured. See section 6.2.7 Advanced Eos configuration**.**

4.8 Utilities

4.8.1 Show wallinfo utility

The X Server provides information about the hardware of the display wall and its setup. This information can be requested as follows:

showwallinfo [-<option>]

The following options are available:

option	argument meaning	value
-d	<display>	0,1
	<display> must be specified in two parts: **hostname:displaynumber.** For the **hostname** the name of the Eos or its IP must be specified. With the **displaynumber** the X Server is specified. 0 must be indicated for the display of Eos. 1 must be indicated for OSIRIS and VISU[Plus].	
-v	<verbose>	0,1,2
	The level of information can be selected. 1 is basic information, 2 is full information. Selecting 0 or omitting verbose provides just a very short description.	

Table 4-40

4.8.2 DDC utility

The UGX- and AGX GRAPHIC CARD supports the DDC standard. DDC stands for Display Data Channel. As a standard communication channel between a computer display and a host system it allows to automatically detect the best setting for a DDC capable display by obtaining these parameters from the display itself.

If Eos is connected to display devices that support the DDC standard, information of this graphic device can be requested as follows:

ddcinfo

No further options are required.

ddcinfo can only be requested as long as the Xserver is not running.

4.8.3 Boot loader utility

When booting Eos a graphical menu appears to select the boot partition. See also section 6.2.1 Boot modes. The boot loader utility helps to change this if wanted. Therefore change by using cd to the directory:

```
cd /opt/MMT2686/config/
```

To switch on the graphical boot selection use:

```
/opt/MMT2686/config/bootgraph on
```

To switch it off use:

```
/opt/MMT2686/config/bootgraph off
```

4.8.4 Restart X server utility (service mmtserv)

The **service mmtserv** utility can be used to restart the X server. By means of the options the color mode can be determined. If the utility is called without option, the X server settings that were assigned in the X.11 configuration are applied. Thus the utility enables to change the color mode without the necessity to run through the X.11 configuration. The following options are available:

option	meaning
pseudo	Restart X server in PseudoColor mode, 8 bpp
true	Restart X server in TrueColor mode, 16 bpp
direct	Restart X server in DirectColor mode, 16 bpp
true32	Restart X server in TrueColor mode, 32 bpp
direct32	Restart X server in DirectColor mode, 32 bpp

Table 4-41
options of service mmtserv

To restart the X server in DirectColor mode, with 16 bpp color depth the following input would be necessary:

```
service mmtserv direct
```

Alternatively the X server can by restarted by means of the entries in the work menu of the window manager, please refer to section 4.5 Window manager.

Please keep in mind that a higher color depth requires also a higher bandwidth for graphic data.

In addition, changing the color mode of the X server might change the color mode of video or RGB and lead therefore also to an increase in required bandwidth for video, please refer to section 4.2.2 Color capabilities of Eos to see which video color mode applies for which X server color mode and if the X server color mode is applicable for the used graphic cards and to section 4.6.1 The input cards to see the required bandwidth for video and RGB.

Both effects might lead to a loss of performance!

It is not possible to restart the X server in multi-color-depth, if an other color mode has been configured in the X.11 configuration.

But if the X server has been configured in multi-color-depth it can be restarted with the other color depths mentioned above. To revert to multi-color-depth the X server must be restarted without option in the default setting.

4.8.5 Backup and restore procedures (eosxs Utility)

If Eos is operated in eXtended safety boot mode, see section 6.2.1 Boot modes a backup of the complete working partition, including the Eos system installation, the X.11 configuration and any additional configuration can be made. Besides the main intention of eliminating the risk of a corrupted file system, new configurations can first be checked and undone if derived.

Check backup procedure

To check if a fully functional system backup is stored on the backup partition enter **`service eosxs`** with the option **`check`** into the command line:

```
service eosxs check
```

With an operable backup the system will respond:

```
eosxs check: OK check passed
```

Backup information

Date and time when the backup was made, gets returned by means of the **`info`** option. Therefore enter the following expression into the command line.

```
service eosxs info
```

Thereupon date and time of the backup is displayed.

Backup procedure

The following steps must be performed to get a backup of the current state of an Eos configuration:

- After finishing the configuration, reboot Eos to make sure, that the configuration is really functional!
- If the Eos rebooted properly and the system works the way it was intended, then locally log in on Eos as root. Take care, that the X server does not run and enter to the command line **`service eosxs`** with the option **`backup`**:

  ```
  service eosxs backup
  ```

- Date and time of the last backup is displayed and you will be prompted to confirm the backup procedure by typing **`y`**.
- Now the system changes into a lower operating level and copies the working partition onto the backup partition. When copying is finished the system reboots from the working partition and can be used as before, but with the security of having an actual system backup for the unlikely but not impossible case of a corrupted file system on the working partition.

Restore procedure

Whenever it is necessary to go back to a saved configuration or to restore the working partition, one out of two possible procedures can be performed.

Either:

- When booting Eos the option **`backup`** can be selected. It either must be selected from the graphical menu when the system comes up, please refer to section 3.3.2 Switching on or the option must be typed as soon as the `lilo` prompt appears. This is dependent on the settings chosen by means of the boot loader utility, please refer to section 4.8.3 Boot loader utility.

Or:

- When Eos is running, enter into the command line **`service eosxs`** with the option **`restore`** to boot from the backup partition:

  `service eosxs restore`

In both cases you have to be logged in locally on the Eos and the X server must not be started.

Before the restore procedure actually starts, date and time of the backup is displayed and you will be prompted to confirm the restore procedure by typing **`y`**.

Following that, the Eos boots from the backup partition. After booting it copies back the version of the working partition that is stored on the backup partition to the working partition. This means that the currently used working partition becomes overwritten. When copying is finished, Eos reboots automatically, this time it boots from the working partition and is therewith operable again, based on the state of system and configuration from the time of the backup.

Whenever booting from the backup partition the content of the working partition becomes overwritten with the backup. This means the current content of the working partition gets lost!

4.8.6 Release integrity utility (eosinfo)

The integrity of the current installation can easily be checked by means of the `eosinfo` utility. If `eosinfo` is entered into the command line, all RPM packages that are installed will be returned. This might look like the following list:

```
This are the Factory shipped RPM Packages (Rel 2.5.0):
-----------------------------------------------------
eosbigcursor-2.4.0-1
eoscfg-2.5.0-1
eosconfig-2.5.0-1
eosdiskless-2.5.0-1
eosmisc-2.5.0-1
eosrctrl-2.4.0-1
eosuser-2.4.0-1
eosutil-2.4.0-1
eosvwm2cfg-2.5.0-1
osxblink-2.4.0-1
eosxmc-2.4.0-1
eosxserver-dis-2.5.0-1
eosxserver-mon-2.5.0-1
eosxtest-2.4.0-1
eosxtrap-2.4.0-1
eosxvideo-2.4.0-1
-----------------------------------------------------

The EOS System is in a save state
```

If there are RPM packages installed on the hard disk that do not belong to the current release or if there are appendant RPM packages missing, this is specially marked in the list and might look like the following:

```
This are the Factory shipped RPM Packages (Rel 2.5.0):
-----------------------------------------------------
eosbigcursor-2.4.0-1
eoscfg-2.5.0-1
eosconfig-2.5.0-1
eosdiskless-2.5.0-1
eosmisc-2.5.0-1
eosrctrl-2.4.0-1
eosuser-2.4.0-1
eosutil-2.4.0-1
eosvwm2cfg-2.5.0-1
eosxblink-2.4.0-1
eosxmc-2.4.0-1
eosxserver-dis-2.5.0-1
eosxserver-mon-2.5.0-1
eosxtest-2.4.0-1
eosxtrap-2.4.0-1
eosxvideo-2.4.0-1
-----------------------------------------------------
WARNING!!
The following EOS RPM Package(s) have been altered:
-----------------------------------------------------
eosxserver-mon-2.5.0-1
eosxvideo-2.4.0-1
-----------------------------------------------------
```

4.8.7 Network reporting utility (procfg)

The **procfg** utility serves to gain information about the configuration and state of the network cards. It can be used for network cards that use the driver **e100** or **e1000**, please refer to section 3.4.1 System configuration. The information can be requested as follows:

procfg [-<option>]

The following command line options are the most useful:

option	argument meaning	value
blink eth<nr>	-t <seconds> The LED on the Ethernet card with the specified number <nr> starts fast blinking for 10 seconds. If -t is indicated the LED blinks during the specified time interval.	
tree	Displays an overview about the inserted network cards including an AFT team.	
teams	lists name and mode of the team and information about its primary adapter, please refer also to section 6.2.8 Redundant network adapter. -m lists all members of the team and their current properties. -i lists interface name, IP address, netmask, broadcast and state of the team members. -p lists the load time parameters and values of the team members.	
adapters	-a Information about the link state, speed and duplex of the network cards and AFT teams is displayed.	

Table 4-42
Options of the procfg utility

More information about **procfg** can be found in the manual pages. The manual pages can be read by entering **man procfg** into the command line.

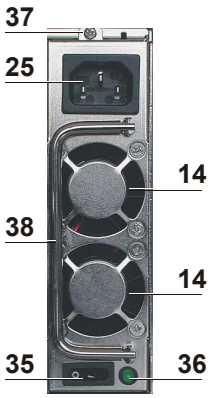
5 Maintenance

Eos requires very little maintenance. Some maintenance operations are nevertheless necessary to maintain distortion free operation of Eos.

5.1 Hot plug procedure

5.1.1 Redundant power module

The redundant power modules of Eos or Eos Extender can be connected to two independent power nets. If one of the two power modules or a power net is failing, you can hear a buzzer alarm that can be reset by pushing the red **buzzer reset** button [5] / [2] at the front of Eos / Eos Extender, please refer to section 3.1.1 Eos / 3.1.2 Eos Extender. Also the LED **power module failed** [6] / [4] at the front lightens up. This LED stays lightened as long as the failure persists even if the **buzzer reset** button was pressed.



14	**air supply**
25	**mains connection**
35	**power switch**
36	**green LED: power module operating**
37	**securing screw**
38	**handle**

Figure 5-1
Power module on the rear of Eos or Eos Extender for redundant operation

The defective power module or the failing power net can be located by examining the individual LED's **power module operating** [36] on the back of Eos / Eos Extender. If the green LED on a power module is off even though it is switched on, the module is either defective and must be re-placed or the power net connected to it has failed.

Exchange of a redundant power module

Never touch the contacts on the backside of a power module. There is the danger of being harmed by residual voltage! Furthermore the functioning of the power module might be impacted by impurities!

Use gloves to remove the power module. The cover of the power module is been used as heat sink for cooling, usually the temperature is around 50 – 60° Celsius under full condition!

- Locate the defective power module by examining the green LED's [36] on the individual power modules. If an LED is not lightened even though its power switch is in the position ON **I**, the respective power module is defective.
- Switch the power switch [35] of the defective power module to position OFF **O.**
- Loosen the securing screws [39] on the top of the power module!
- Remove the defective power module by pulling at the handle [38]!
- Take a new power module and check that its power switch [35] is at the position OFF **O**.
- Insert the power module into the system. Take care to insert it in the same orientation like the other module with the mains connection [25] on the upper side!
- Tighten the securing screw!
- Switch on the power module with the power switch [35]!
- Check that the green LED [36] lightens up!
- Check that the red LED **power module failed** [6] / [4] at the front of Eos / Eos Extender stops lightening!

5.1.2 RAID

An instruction of the operation of the RAID hard disks can be found in the attached user's manual of the manufacturer.

5.2 Exchange of consumables

5.2.1 Replacing the filter pad of Eos

The filter pad of Eos case has to be changed in intervals, depending on the grade of pollution of the air.

The air filter is located behind the ventilation slits on the front of Eos.

- Unlock the front cover of Eos with the key!
- Pull the handle of the filter mounting into your direction!
- Pull out the filter mounting to the right!
- Remove the old filter pad!
- Insert a new filter pad!
- Insert the mounting into Eos until the handle engages!
- Lock the front cover!

As long as the filter pad is not irreversibly blocked, cleaning it with a vacuum cleaner is also an acceptable method to maintain a good air ventilation within the system!

5.2.2 Replacing the battery

The battery is located inside of Eos on the main board.

Incorrect replacement of the lithium battery may lead to a risk of exposion!

The lithium battery may be replaced only with an identical battery or with a type recommended by the manufacturer!

Do not throw lithium batteries into the household waste. They must be disposed of in accordance with local regulations concerning special waste!

The battery may explode if mistreated. Do not dispose it of in fire! Do not disassemble it or attempt to recharge it!

Make sure that you insert the battery the right way round. The plus pole must be on the top!

- Open the case as described in Section 6.1.1 Opening the case!
- Locate the battery on the main board!
- Tear back the clamp until the battery lifts up!

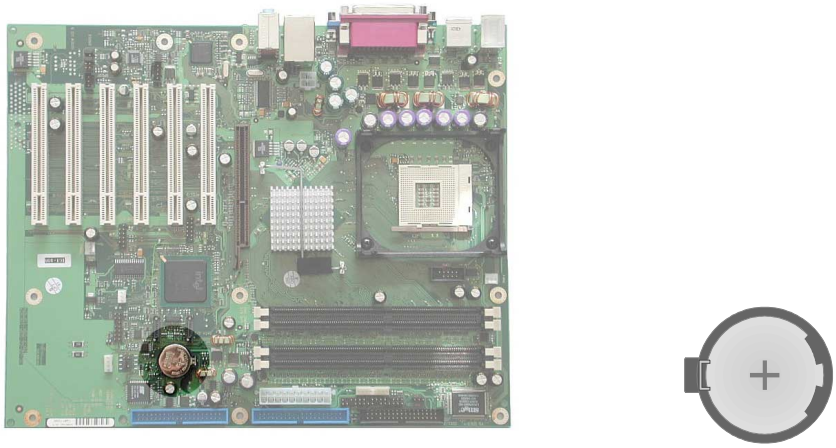


Figure5-2
Battery on the main board

- Replace the lithium battery by a new one of the identical type. Do not use any other type!
- Replace the top cover.

5.3 Cleaning

Use a soft cloth to periodically clean the cabinet. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution. Never use strong solvents, such as thinner or benzine, or abrasive cleaners, since these will damage the cabinet.

Unplug the device from the wall outlet before cleaning.

Never clean the case of Eos without first disconnecting all power supply cords!

Do not use liquid cleaners or aerosol cleaners!

6 Advanced Configuration

This chapter provides help for reconfiguring the software and hardware of your Eos.

6.1 Installing additional hardware

6.1.1 Opening the case

Before opening the case, switch off Eos! Disconnect all power plugs! Remove all cables!

The boards of Eos contain CMOS components. Do not touch the components, they could be destroyed!

Figure 6-1
Position of screws on the side of Eos

Loosen the screws **1** and **2** shown in the figure above on both sides of the case. For these screws as well as for the screws inside of Eos you need a size 2 Phillips screwdriver. Some screws inside Eos can be loosen with a 5.5 spanner as well.

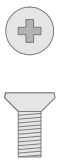


Figure 6-2
Screws of the case of Eos

Now you can easily remove the top cover.

If you have removed the top cover of Eos in order to add boards or memory or to exchange the battery, be sure to replace the cover before powering up again!

Inside of the housing there is a transportation lock, which must also be removed to be able to insert expansion cards. Loosen the screws **4**, **5** (and **6**) and take out the plate.

Before closing the housing the transportation lock must be readjusted. Therefore first insert the plate, then turn in the screws but do not tighten them. Push the plate as far towards the cards as possible. Just then tighten the screws:

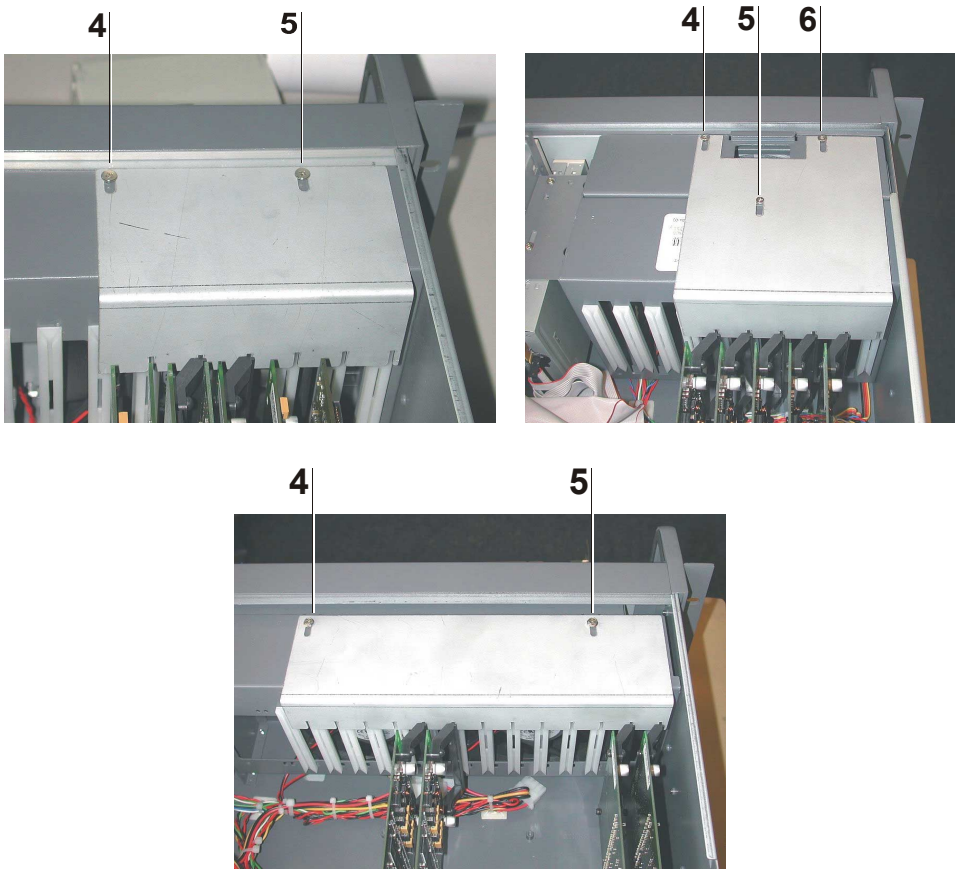


Figure 6-3
Transportation lock of the Eos EOS-3026 (top left),
of the Eos EOS-3327 for redundant operation (top right)
and of the Eos Extender EOS-3193 (bottom)

On the mainboard of Eos there are PCI slots for inserting expansion cards:

PCI slots

PCI slots for graphic cards, OMNISCALERS, input cards, network cards and Multiport I/O Card.

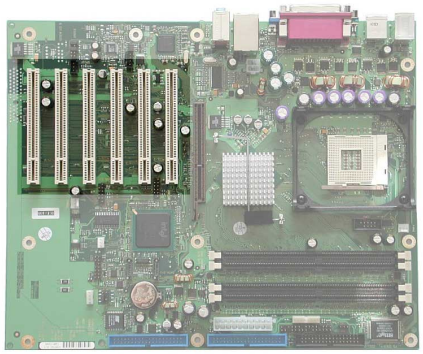


Figure 6-4
PCI slots

Barco recommends certain expansion cards for the use in Eos! Using other cards or hardware combinations other than described in this manual might cause damage to the Eos or might damage the cards themselves! The described graphic and video capabilities of Eos are only available with the original expansion cards from Barco.

6.1.2 Inserting additional main memory

In standard configuration Eos is equipped with 256MB or 512MB main memory. With additional memory modules main memory can be increased. Please see the table below for the maximal increase of main memory.

	Maximal Main Memory
EOS-3026-01, EOS-3026-02	1GB SD RAM
EOS-3026-03, EOS-3026-1, EOS-3026-2	512GB SD RAM
EOS-3026-3, EOS-3026-4, EOS-3327-0, EOS-3327-1	1GB DDR RAM
EOS-3026-5, EOS-3327-2, EOS-3327-3	2GB DDR RAM

Table 6-1
maximal main memory of Eos

It is highly recommended to get DIMMs from Barco. Please, refer to section 7.3 Order codes. If you use other memory modules Barco can not guarantee for proper and stable system function.

Please note that the versions EOS-3026-3/-4 and EOS-3327-0/-1 of the Processor use different memory modules than the versions EOS-3026-5, EOS-3327-2 and EOS-3327-3!

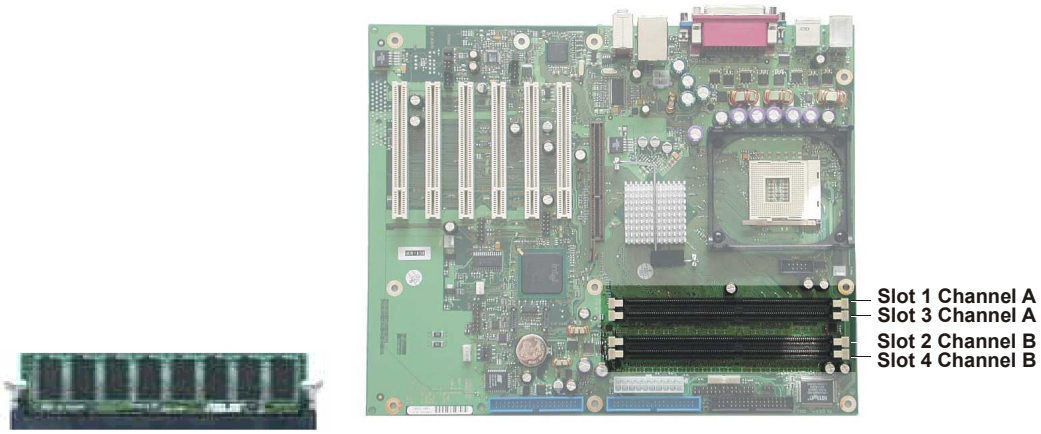


Figure 6-5
Inserting additional memory

Memory modules are made of delicate electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or work environment can destroy them. Transport memory modules only in the original packaging as delivered from the manufacturer. Handle them only by the edges. Do not touch the components. Use a grounded workplace and wear a grounding wrist strap; at least, discharge your body's static electricity by touching a grounded surface, e. g., a properly grounded system's metal chassis.

- Open the case as described in Section 6.1.1 Opening the case!
- Locate the memory sockets: The 184-pin slots (**EOS-3026-3/4/5, EOS-3327-0/1/2/3**) respectively 168-pin slots (**EOS-3026-0/1/2**) are lined up parallel and you will find them near the CPU. Because the number of pins is different on either side of the breaks, the module will only fit in the correct orientation.
- Examine the memory modules before removing from the anti static bag. If there is any visible damage, do not install the module and contact the manufacturer.
- Do not remove the memory module from the anti static bag until you are ready to install it. Use a grounded workplace. Do not lay parts on the anti static bags. Only the insides are anti static.

- The order of the memory modules must be taken into consideration:
  On the mainboard of the models **EOS-3026-3/-4** or **EOS-3327-0/-1** there are three sockets. The socket closest to the CPU is the socket 1 followed by socket 2 and socket 3. The table below lists the possible combinations.

Socket 1	Socket 2	Socket 3	total memory
MEM-3213-0 or –3 (256MB)	**-**	**-**	**256 MB**
MEM-3213-1 or –4 (512MB)	**-**	**-**	**512 MB**
MEM-3213-0 or –3 (256MB)	**MEM-3213-0 or –3 (256MB)**	**-**	**512 MB**
MEM-3213-1 or –4 (512MB)	**MEM-3213-0 or –3 (256MB)**	**-**	**768 MB**
MEM-3213-0 or –3 (256MB)	**MEM-3213-1 or –4 (512MB)**	**-**	**768 MB**
MEM-3213-1 or –4 (512MB)	**MEM-3213-1 or –4 (512MB)**	**-**	**1024 MB**
MEM-3213-0 or –3 (256MB)	**MEM-3213-0 or –3 (256MB)**	**MEM-3213-0 or –3 (256MB)**	**768 MB**
MEM-3213-1 or –4 (512MB)	**MEM-3213-0 or –3 (256MB)**	**MEM-3213-0 or –3 (256MB)**	**1024 MB**

Table 6-2
combinations of DDR RAM for EOS-3026-3/-4, EOS-3327-0/-1

- On the mainboard of the models **EOS-3026-5**, **EOS-3327-2** and **EOS-3327-3** there are four sockets. The socket closest to the CPU is the socket 1 followed by socket 3, socket 2 and socket 4; please see the figure above. Fastest memory access is achieved, if always a pair of sockets (socket 1 and 2 and socket 3 and 4) is equipped with identical memory modules. The table below lists these optimal combinations:

Socket 1	Socket 3	Socket 2	Socket 4	total memory
MEM-3213-5 (256MB)		**MEM-3213-5 (256MB)**		**512 MB**
MEM-3213-6 (512MB)		**MEM-3213-6 (512MB)**		**1024 MB**
MEM-3213-5 (256MB)	**MEM-3213-5 (256MB)**	**MEM-3213-5 (256MB)**	**MEM-3213-5 (256MB)**	**1024 MB**
MEM-3213-6 (512MB)	**MEM-3213-5 (256MB)**	**MEM-3213-6 (512MB)**	**MEM-3213-5 (256MB)**	**1536 MB**
MEM-3213-6 (512MB)	**MEM-3213-6 (512MB)**	**MEM-3213-6 (512MB)**	**MEM-3213-6 (512MB)**	**2048 MB**

Table 6-3
combinations of DDR RAM for Eos EOS-3026-5, EOS-3327-2 and EOS-3327-3

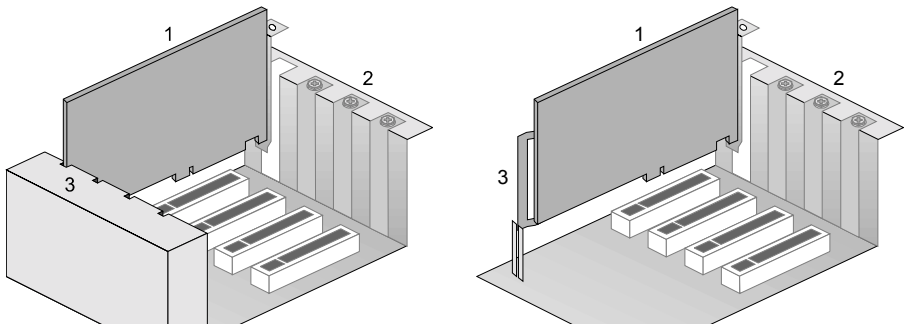
- Orient the memory module so that it faces the same way the old module did. Press the module firmly into place until it clicks into place and the plastic clips snap into position and fix it.
- To release the memory module, squeeze both plastic clips outwards until the module lifts up.
- Replace the top cover, connect Eos and restart it. Log in as root!

After the next boot process the additional main memory is addressed and able to operate.

6.1.3 Inserting an additional expansion card

The expansion cards are made of delicate electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or work environment can destroy them. Transport expansion cards only in the original packaging as delivered from the manufacturer. Handle them only by their edges and their metal mounting bracket. Do not touch the components nor the edge connectors that plug into the expansion slots. Use a grounded workplace and wear a grounding wrist strap; at least, discharge your body's static electricity by touching a grounded surface, e. g., a properly grounded system's metal chassis.

- Please check first the restrictions given in section 6.1.5 Combination rules before inserting or exchanging an expansion card.
- Open the case as described in section 6.1.1 Opening the case!
- Remove the bracket on the slot you intend to use. Keep the screw you have to remove and keep the bracket for possible further use.
- Examine the card before removing from the anti static bag. If there is any visible damage, do not install the card and contact Barco.
- Do not remove the card from the anti static bag until you are ready to install it. Use a grounded workplace. Do not lay parts on the anti static bag. Only the insides are antistatic.
- If you are inserting a Multiport I/O Card please check the jumper settings and order of the card first, see section 6.1.6 Multiport I/O Card.
- Carefully align the card's connectors with the socket and press firmly. The ISA retainer at the end of the card or the end of the card itself must be fitted into the respective guide if there is any.



1	Card
2	Bracket
3	guide at ventilation case / ISA retainer

Figure 6-6
Inserting an expansion card

- Secure the card on the slot with the screw you removed in step 2.
- If you have inserted a UGX-/AGX GRAPHIC CARD or a graphic card with digital output you have to select the appropriate resolution with a rotary switch on the board as described in section 6.1.4 Switching resolution of graphic card.
- Replace the top cover.

After inserting an additional graphic card you have to repeat system configuration as described in section 3.4.2 X.11 configuration.

6.1.4 Switching resolution of graphic card

Figure 6-7
Rotary switch for selecting appropriate resolution

The appropriate resolution is selected with a rotary switch on the board. The figure above shows this rotary switch located on top of an inserted graphic card. All cards must be set to the same resolution! The following table shows the possible settings:

switch	projection module	resolution		DDC active
0	OverView-mL	VGA	640×480	no
1	OverView-mL	SVGA	800×600	no
	OverView-mD	SVGA	800×600	
	OverView-mE	SVGA	800×600	
2	OverView-mL	XGA	1024×768	no
4	OverView-mP	XGA	1024×768	no
	Atlas67C4-PSI for modules older than Q2/03	XGA	1024×768	
5	OverView-mP	SVGA	800×600	no
	Atlas67C4-PSI	SVGA	800×600	
	OverView-mE	SVGA	800×600	
6	digital output: 60 Hz VESA timing	SXGA	1280×1024	no
7	OverView-mP Atlas67C4-PSI modules from Q2/03 and newer	XGA	1024×768	no
8	OverView mDR50/67-DL (1)	SXGA	1280×1024	no
9	Atlas CS4, S70 digital output via DVI connector	SXGA	1280×1024	no
F	digital output with DDC connected display device provides DDC information	VGA SVGA XGA WXGA SXGA	640×480 800×600 1024×768 1280×768 1280×1024	yes
	analog output (CRT) with DDC connected monitor provides DDC information	software defined (If DDC information conflicts with the display settings, the X server terminates, displaying a warning)		yes
	analog output (CRT)	software defined		no

Table 6-4
selectable resolutions of the UGX and AGX Graphic Card

(1) For OverView mDR50/67-DL usually the switcher position **F** is selected as it provides DDC information. Nevertheless in a set-up where DDC can not be evaluated, switcher position **8** can be selected instead.

For AGX Graphic Cards switcher position 7 and 8 is only available with BIOS revision FMW-3000-06 or newer and switcher position 9 is only availabe with BIOS revision FMW-3000-08 or newer.
The Version of the BIOS revision is printed on the mikrocontroller on the graphic card.

If a digital VisuPlus is connected between Eos and projection module nevertheless the resolution of the projection module has to be chosen.

6.1.5 Combination rules

When extending a system by inserting additional expansion cards into an Eos or Eos Extender or by exchanging a card with a card of different type, the following rules must be checked to see, if the planned configuration is possible.

Functional rules

- In an Eos the number of inserted cards must not exceed 6, in an Eos Extender 13 expansion cards.
- OmniScaler SXGA (**AGX-3002**) and OmniScaler UXGA (**AGX-3313**) can be mixed.
- Systems with UGX Graphic Card and UXGA output must use OmniScalers UXGA.
- Quad Analog Video Card, Streaming Video Card and Dual RGB Input Card may only be used together with OmniScalers
- AGX Graphic Cards and UGX Graphic Cards may only be mixed in some cases. Please see the table below:

type	monolithic system	distributed system
UGX and AGX	no	no
UGX-digital and UGX-analog	no	yes (1)
AGX-digital and AGX-analog	no	yes (1)

Table 6-5

1) same type within one engine

For best display quality of the video and RGB sources, in addition the following should be considered:

- Video and RGB windows may not require too much bandwidth, please see section 4.6.1 The input cards.

Overload calculation

- Not more than 6 AGX GRAPHIC CARDS or 3 UGX GRAPHIC CARDS may be inserted into a monolithic EOS system.

- In a distributed system each rendering machine may contain 5 AGX GRAPHIC CARDS or 3 UGX GRAPHIC CARDS!

- There are four criteria **V1**, **V2**, **V3** and **M1**. Each of them must be valid, to allow the card to be inserted.

The rule for the criteria **V1**, **V2** and **V3** is the following. For each card there is a factor that must be multiplied by the amount how often it is inserted in the device (EOS or EOS EXTENDER). The sum may not exceed 100, if the configuration shall be allowed. The calculation for criterion M1 is similar, but finally the sum of all EOS and EOS EXTENDER devices of the system my not exceed 100.

	Eos standard			**Eos Extender** standard			**Eos / Eos Extender** redundant operation		
	V1	**V2**	**V3**	**V1**	**V2**	**V3**	**V1**	**V2**	**V3**
AGX GRAPHIC CARD	6.20	3.09	5.75	5.78	1.85	4.14	6.94	2.65	5.24
UGX GRAPHIC CARD	5.37	12.33	13.03	5.01	7.40	9.38	6.01	10.57	11.88
OMNISCALER max. SXGA	2.89	6.55	6.94	2.70	3.93	5.00	3.24	5.62	6.33
OMNISCALER max. UXGA	3.31	7.71	8.12	3.09	4.63	5.85	3.70	6.61	7.40
QUAD ANALOG VIDEO CARD	14.45	5.78	12.23	13.49	3.47	8.81	16.18	4.96	11.15
DUAL RGB INPUT CARD	12.80	5.78	11.39	11.95	3.47	8.20	14.33	4.96	10.38
STREAMING VIDEO CARD	18.16	8.48	16.39	16.95	5.09	11.80	20.34	7.27	14.94
optical cables	–	0.81	0.68	–	0.49	0.49	–	0.70	0.62
Maximum allowed:	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 6-6
components factors for configuration criteria calculation **V1**, **V2** and **V2**

It is not allowed to configure combinations of cards that do not fullfil the three above criteria. Otherwise there is the risk to destroy the power supply!

The calculation for criterion **M1** is similar, but finally the sum of all EOS and EOS EXTENDER devices and all expansion cards of the system my not exceed 100.

	Eos complete system
	M1
EOS base unit	3.13
EOS main memory 256 MB	6.25
AGX GRAPHIC CARD	9.45
UGX GRAPHIC CARD	17.19
OMNISCALER max. SXGA	0.79
OMNISCALER max. UXGA	0.79
QUAD ANALOG VIDEO CARD	1.62
DUAL RGB INPUT CARD	1.62
STREAMING VIDEO CARD	1.62
Maximum allowed:	**100**

Table 6-7
components factors for configuration criterion calculation **M1**

Example

The following example illustrates how a configuration can be checked. Assuming a configuration with one Eos and two Eos Extenders, both equipped with the same amount and types of boards. We here fist calculate the three criteria V1, V2 and V3 for one Eos Extender. After that we check the criteria M1 for both the Eos and the Eos Extenders.

For 1 UGX Graphic Card, 2 OmniScalers UXGA, 1 Quad Analog Video Cards, 1 Dual RGB Input Cards and 2 Streaming Video Cards used together in one Eos Extender for redundant operation the following calculation must be made:

	V1			V2			V3		
	Factor	**Amount**	**Result**	**Factor**	**Amount**	**Result**	**Factor**	**Amount**	**Result**
AGX Graphic Card	6.94	*		2.65	*		5.24	*	
+ UGX Graphic Card	6.01	* 1	= 6.01	10.57	* 1	=10.57	11.88	* 1	=11.88
+ OmniScaler max. SXGA	3.24	*		5.62	*		6.33	*	
+ OmniScaler max. UXGA	3.70	* 2	= 7.40	6.61	* 2	=13.22	7.40	* 2	=14.80
+ Quad Analog Video Card	16.18	* 1	=16.18	4.96	* 1	= 4.96	11.15	* 1	=11.15
+ Dual RGB Input Card	14.33	* 1	=14.33	4.96	* 1	= 4.96	10.38	* 1	=10.38
+ Streaming Video Card	20.34	* 2	=40.68	7.27	* 2	=14.54	14.94	* 2	=29.88
+ optical cables	–			0.70	* 4	= 2.80	0.62	* 4	= 2.48
= (≤ 100)			84.60			51.05			80.57

Table 6-8
Calculating the configuration criteria **V1**, **V2** and **V2** for Eos Extender with redundant operation

For the criterion M1 the Eos and both Eos Extenders have to be considered. The Eos Extenders are equipped equally this means all together with 2 UGX Graphic Cards, 4 OmniScalers UXGA, 2 Quad Analog Video Cards, 2 Dual RGB Input Cards and 4 Streaming Video Cards. The Eos is equipped with 512 MB main memory, therefore the factor for 256 MB main memory must be multiplied by 2. This leads to the following calculation:

	M1		
	Factor	**Amount**	**Result**
Eos base unit	3.13	* 1	= 3.13
+ Eos main memory 256 MB	6.25	* 2	= 12.50
+ AGX Graphic Card	9.45	*	
+ UGX Graphic Card	17.19	* 2	= 34.38
+ OmniScaler max. SXGA	0.79	*	=
+ OmniScaler max. UXGA	0.79	* 4	= 3.16
+ Quad Analog Video Card	1.62	* 2	= 3.24
+ Dual RGB Input Card	1.62	* 2	= 3.24
+ Streaming Video Card	1.62	* 4	= 6.48
= (≤ 100)			66.13

Table 6-9
Calculating the configuration criterion **M1** for the whole Eos system

The results for V1, V2 and V3 as well as the result for M1 are each smaller than 100; the configuration is possible!

To calculate the ability to insert additional cards into your system below there are three calculation tables given for the calculation of V1, V2 and V3 of the respective Eos devices and one table for the calculation of M1 of the complete system.

Configuration table for a standard Eos:

	Eos standard								
	V1			V2			V3		
	Factor	**Amount**	**Result**	**Factor**	**Amount**	**Result**	**Factor**	**Amount**	**Result**
AGX Graphic Card	6.20	*	=	3.09	*	=	5.75	*	=
+ UGX Graphic Card	5.37	*	=	12.33	*	=	13.03	*	=
+ OmniScaler max. SXGA	2.89	*	=	6.55	*	=	6.94	*	=
+ OmniScaler max. UXGA	3.31	*	=	7.71	*	=	8.12	*	=
+ Quad Analog Video Card	14.45	*	=	5.78	*	=	12.23	*	=
+ Dual RGB Input Card	12.80	*	=	5.78	*	=	11.39	*	=
+ Streaming Video Card	18.16	*	=	8.48	*	=	16.39	*	=
+ optical cables	–			0.81	*	=	0.68		
= (≤ 100)									

Table 6-10
Calculator for V1, V2, V3 for standard Eos

Configuration table for a standard Eos Extender:

	Eos Extender standard								
	V1			V2			V3		
	Factor	**Amount**	**Result**	**Factor**	**Amount**	**Result**	**Factor**	**Amount**	**Result**
AGX Graphic Card	5.78	*	=	1.85	*	=	4.14	*	=
+ UGX Graphic Card	5.01	*	=	7.40	*	=	9.38	*	=
+ OmniScaler max. SXGA	2.70	*	=	3.93	*	=	5.00	*	=
+ OmniScaler max. UXGA	3.09	*	=	4.63	*	=	5.85	*	=
+ Quad Analog Video Card	13.49	*	=	3.47	*	=	8.81	*	=
+ Dual RGB Input Card	11.95	*	=	3.47	*	=	8.20	*	=
+ Streaming Video Card	16.95	*	=	5.09	*	=	11.80	*	=
+ optical cables	–			0.49	*	=	0.49		
= (≤ 100)									

Table 6-11
Calculator for V1, V2, V3 for standard Eos Extender

Configuration table for an Eos base unit or Eos Extender for redundant operation:

	Eos redundant operation **Eos Extender** redundant operation								
	V1			V2			V3		
	Factor	**Amount**	**Result**	**Factor**	**Amount**	**Result**	**Factor**	**Amount**	**Result**
AGX Graphic Card	6.94	*	=	2.65	*	=	5.24	*	=
+ UGX Graphic Card	6.01	*	=	10.57	*	=	11.88	*	=
+ OmniScaler max. SXGA	3.24	*	=	5.62	*	=	6.33	*	=
+ OmniScaler max. UXGA	3.70	*	=	6.61	*	=	7.40	*	=
+ Quad Analog Video Card	16.18	*	=	4.96	*	=	11.15	*	=
+ Dual RGB Input Card	14.33	*	=	4.96	*	=	10.38	*	=
+ Streaming Video Card	20.34	*	=	7.27	*	=	14.94	*	=
+ optical cables	–			0.70	*	=	0.62		
= (≤ 100)									

Table 6-12
Calculator for V1, V2, V3 for Eos and Eos Extender for redundant operation

Configuration table for criterion M1 for the complete Eos system:

	Eos complete system		
	M1		
	Factor	**Amount**	**Result**
Eos base unit	3.13	*	=
+ Eos main memory 256 MB	6.25	*	=
+ AGX Graphic Card	9.45	*	=
+ UGX Graphic Card	17.19	*	=
+ OmniScaler max. SXGA	0.79	*	=
+ OmniScaler max. UXGA	0.79	*	=
+ Quad Analog Video Card	1.62	*	=
+ Dual RGB Input Card	1.62	*	=
+ Streaming Video Card	1.62	*	=
= (≤ 100)			

Table 6-13
Calculator for M1 for complete Eos system

6.1.6 Multiport I/O Card

The Multiport I/O Card supports two serial devices. Up to three cards can be inserted into one Eos.

Jumper settings

Before inserting a Multiport I/O Card the jumper on the board has to be set in the correct way. The following positions for **JP1** can be chosen:

pin	max. speed in bps	meaning
2 and 3	921600	recommended, enhanced speed option
1 and 2	115200	compatibility speed for direct port access

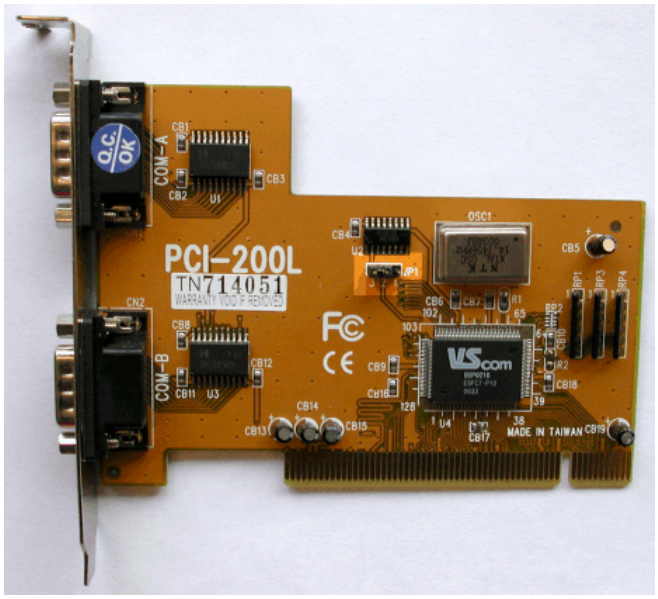


Figure 6-8
jumper setting on Multiport I/O Card

Configuration

The configuration script runs automatically after rebooting Eos. The devices are named according to the table below, depending on the number of inserted Multiport I/O Cards, multiple devices are added:

connection	device	number of Multiport I/O Card
COM3	**ttyS2**	**1**
COM4	**ttyS3**	**1**
COM5	**ttyS4**	**2**
COM6	**ttyS5**	**2**
COM7	**ttyS6**	**3**
COM8	**ttyS7**	**3**

Table 6-14
commands for the installation of additional serial ports

Combination of Multiport I/O Card and Ethernet cards

If the Multiport I/O Card is used together with the Ethernet Card 100 Mbps or the Ethernet Card 1000 Mbps some restrictions concerning the used PCI slots have to be taken into account, depending on the model of Eos.

model of Eos	combination of Multiport I/O Card and Ethernet Card 100 Mbps or 1000 Mbps
EOS-3026-02 and earlier	**PCI1** and **PCI5** if the shared slot is used for PCI card **PCI2** and **PCI6** don't use both slots at the same time for Ethernet cards and Multiport I/O cards.
	PCI1 and **PCI5** if the shared slot is used for ISA card don't use both slots at the same time for Ethernet cards and Multiport I/O cards.
EOS-3026-03 up to **EOS-3327-0/1**	**PCI2** and **PCI6** don't use both slots at the same time for Ethernet cards and Multiport I/O cards.

Table 6-15

The location of the PCI slots in your Eos is described in section 3.1.1 Eos. The model of the Eos you can see on the label on the back of the Eos housing.

6.2 Software installation and configuration

6.2.1 Boot modes

Eos can either be installed with normal boot mode or with eXtended safety boot mode. Furthermore there is the legacy failsafe boot mode.

Normal boot mode

With normal boot mode the hard disk of the Eos system is configured to have one partition, this is the working partition. Underlying is the ext3 file system that offers widely immunity to file corruption in case of power failure or when switching of the system without having performed a system shutdown before.

An Eos with normal boot mode offers full write access to the system partition. To configure Eos just insert the configuration disk into the CD-ROM or call the corresponding configuration script from the hard disk and perform the configuration as explained in the corresponding sections.

Although the ext3 file system offers good protection against file system inconsistencies, for safely switching off, the system has to be shut down first (see section 3.3.3 Switching off).

eXtended safety boot mode

With eXtended safety boot mode the hard disk of the Eos system contains two partitions, the working partition and the backup partition. eXtended safety boot mode is like normal boot mode also based on the ext3 file system. But in addition it offers the possibility to store on the backup partition a backup of the whole system including its configuration. A backup with the current state of the working partition can be made at any time and the working partition can easily be restored in case of a miss-configuration or failure in operability. Please see section 4.8.5 Backup and restore procedures (eosxs Utility) for details.

eXtended safety boot mode is the recommended boot mode for Eos.

Failsafe boot mode

The legacy failsafe boot mode is not longer supported from release 3.1 on. An Eos that was operated in failsafe boot mode can be installed in normal or eXtended boot mode instead.

Please contact the Barco support before installation!

6.2.2 Installing system software on the hard drive

Usually Eos comes with preinstalled system software. In case you want to reinstall the system software or install a new hard disk, please follow the instructions in this section.

Installation

Switch on Eos and insert the system CD. Eos will boot from CD. The installation follows the same procedure for all kind of operating modes. The Welcome Screen displays a selection of installation options. Select the type for your installation and enter the required keyword.

- Eos in eXtended safety boot mode:
  press the **<Enter>** key
- Eos in normal boot mode:
  type **eosn** and press the **<Enter>** key
- Upgrade Eos:
  please see section 6.2.3 Upgrading system software!

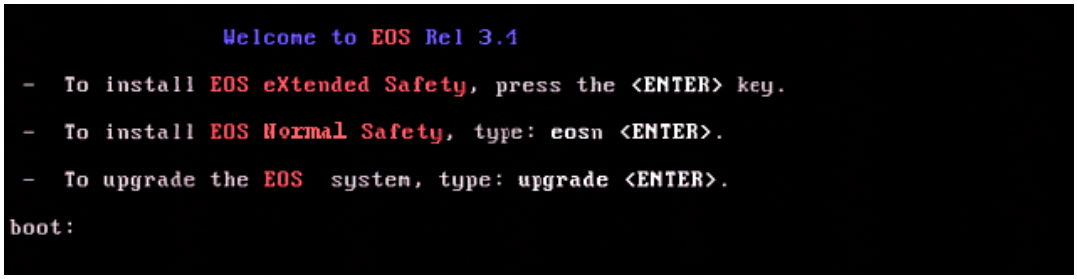

Welcome to EOS Rel 3.1
- To install EOS eXtended Safety, press the <ENTER> key.
- To install EOS Normal Safety, type: eosn <ENTER>.
- To upgrade the EOS system, type: upgrade <ENTER>.
boot:

Figure 6-9

After selecting the type of your installation, you are asked if you really want to delete the partitions and install the system software. If you want to skip the installation you can press **<alt><ctrl><delete>** simultaneously. If you want to install you must confirm with **y <cr>** and the Eos operating system is getting installed.

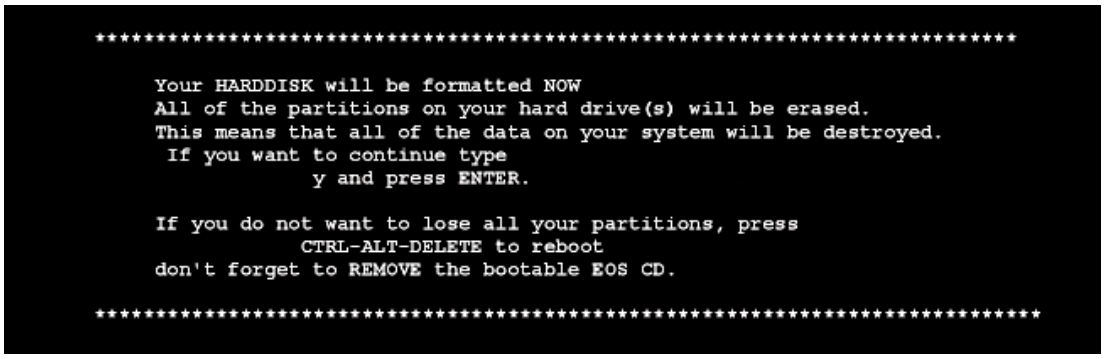

Your HARDDISK will be formatted NOW
All of the partitions on your hard drive(s) will be erased.
This means that all of the data on your system will be destroyed.
If you want to continue type
y and press ENTER.
If you do not want to lose all your partitions, press
CTRL-ALT-DELETE to reboot
don't forget to REMOVE the bootable EOS CD.

Figure 6-10

When the system software is installed just the keyboard and the IP address of the primary network card must be specified. Select the type of the used keyboard with the **arrow** keys and confirm **OK**. If you press **Cancel** a keyboard of **us** type becomes installed by default.

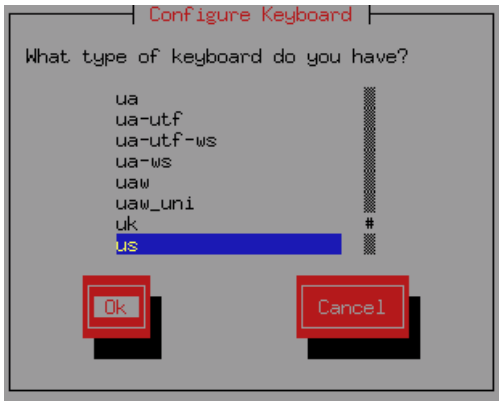


Figure 6-11

The configuration of the keyboard is reported:

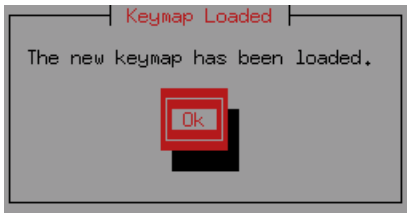


Figure 6-12

The second configuration item is the network configuration. Pressing the **Yes** button enables to insert an individual IP address and netmask. Pressing the **No** button configures the default IP address 192.168.0.1.

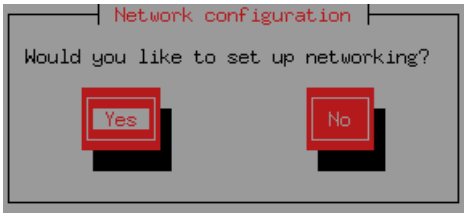


Figure 6-13

To set up networking, enter the IP address and netmask and if needed a default gateway and the primary name-server and confirm with **OK**. If in doubt about the network settings ask your network administrator for the values. When navigating through the dialog and leaving empty the fields for the default gateway or primary name server, there will be default values entered automatically into the empty fields. To overcome this the **F12** key can be pressed instead of the **OK** button.

Configure TCP/IP
Please enter the IP configuration for this machine. Each item should be entered as an IP address in dotted-decimal notation (for example, 1.2.3.4).
IP address: 192.168.1.1
Netmask: 255.255.255.0
Default gateway (IP):
Primary nameserver:
OK
Back

Figure 6-14

When the installation is finished you are prompted to press the **<Enter>** key to reboot Eos.

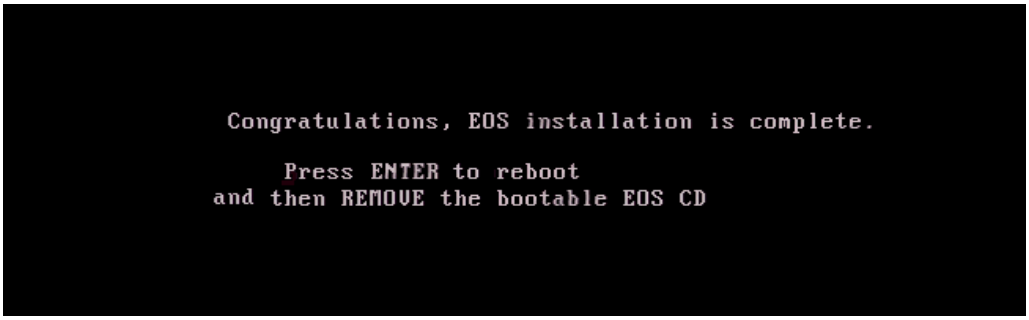


Figure 6-15

The system will reboot now. Remove the CD from the drive as soon as the drawer ejects it. After this system installation you have also to run through 3.4.1 System configuration and 3.4.2 X.11 configuration and if you have a distributed system through 3.4.3 Configuring a distributed system or 3.4.5 Configuring a distributed system with multiple logical screens.

6.2.3 Upgrading system software

Upgrading the system software to the current release is only possible if already release 2.4 or higher is installed on Eos. For upgrading purposes use the installation CD.

Release 2.3 and earlier can not be upgrated to release 2.4 and higher. Instead a complete system installation is necessary. Please note that this will delete any data from the harddisk and that also complete configuration is necessary after the installation! Information about system installation you find in section 6.2.2 Installing system software on the hard drive**.**

From release 3.1 on an Eos with the legacy failsafe boot mode can not be upgraded. Please refer to section 6.2.1 Boot modes**.**

Booting Eos for upgrading

If you install the system software for normal boot mode, switch on Eos and insert the system CD. Eos will boot from CD.

Upgrade

The upgrade is the same procedure for all kind of operating modes. The Welcome Screen displays a selection of installation and upgrade options. To upgrade Eos type `upgrade` and press the **<Enter>** key.

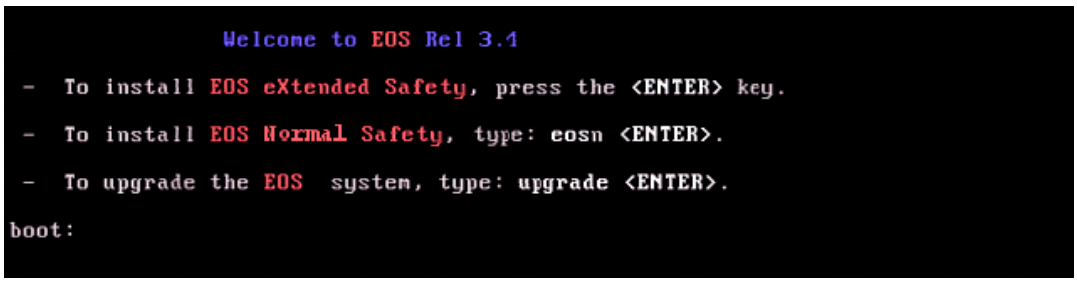


Figure 6-16

Before the upgrade starts just the keyboard must be specified. Select the type of the used keyboard with the **arrow** keys and confirm **OK**. If you press **Cancel** a keyboard of **us** type becomes installed by default.

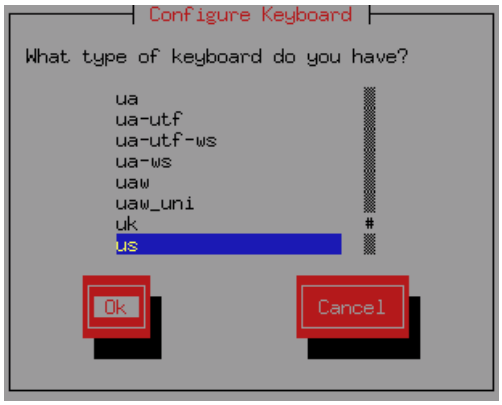


Figure 6-17

When the upgrade is finished you are prompted to press the **<Enter>** key to reboot Eos.

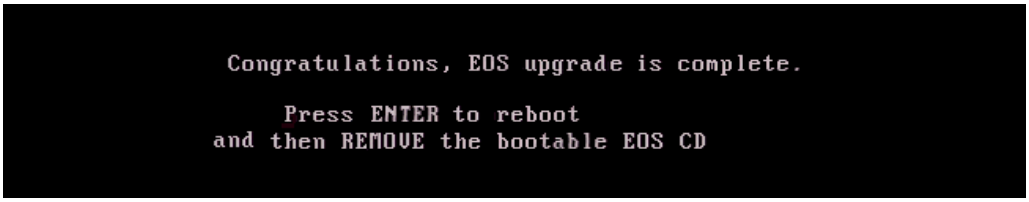


Figure 6-18

The system will reboot now. Remove the CD from the drive as soon as the drawer ejects it. After this system upgrade you have also to run through 3.4.2 X.11 configuration and if you have a distributed system through 3.4.3 Configuring a distributed system or 3.4.5 Configuring a distributed system with multiple logical screens.

If you operate Eos in eXtended safety boot mode, after the upgrade the backup partition still contains the backup of the working partition containing the state from before the upgrade. If you are sure that you want to keep the new release it is recommended to make a new backup of the system, please refer to section 4.8.5 Backup and restore procedures (eosxs Utility)**.**

From release 3.4 on the default assignment of video channels in a distributed system has changed. To maintain the former video assignment the option `-new_video_layout` **must be removed from the X server parameters file** `MMTServerConfig` **each time after the X.11 configuration before restarting the X server, please see section** 6.2.6 X server parameters**.**

6.2.4 Installation of Osiris

You find a description about the installation of Osiris in the Osiris user's manual, see section 7.3 Order codes.

6.2.5 Custom configuration

If you select **`Custom Configuration`** when starting the system configuration script, you run through an abbreviated configuration. The extent of the configuration can be customized, i. e. you can decide for each parameter whether it is called up by the configuration script or not.

Configuration

The default configuration for custom configuration is stored in a text file:

```
/etc/MMTconfig/MMTProfile
```

Each line contains a single keyword and its status, e. g.:

```
ASK_PRIMARY_HOSTNAME 1
```

Status **`1`** stands for **yes, the item is called up** during custom configuration, and status **`0`** stands for **no, item is not called up**. Blank lines as well as unknown keywords are ignored.

Following table shows the standard configuration for custom configuration, as stored in `MMTProfile`:

ASK_PRIMARY_NIC_TYPE	0	Type of interface (100 Mbps, BNC, ...)
ASK_X11_CURSOR	0	Size of X.11 cursor
ASK_X11_MOUSE	0	Type of X.11 mouse
ASK_X11_FONTSERVER	0	IP address and port number of font server
ASK_X11_BITPERPIXEL	0	Color depth (bit per pixel)
ASK_X11_VISUALCLASS	0	Visual class
ASK_X11_XDM	0	IP address of XDM and type of query
ASK_X11_MONITOR_TYPE	0	Type of monitor (analog/digital)
ASK_MONOLIT_SCREEN_MODE	0	Multi-head/multi-screen
ASK_MONOLIT_SCREEN_ARRANGEMENT	1	Layout of multi-screen mode
ASK_MONOLIT_MON_RESOLUTION	0	Resolution of monitor
ASK_ENGINE_NETWORK	0	IP address, net-mask, broadcast address for rendering machine
ASK_ENGINE_ETHERADDR	1	Ethernet address for rendering machine
ASK_ENGINE_SCREEN_ARRANGEMENT	0	Multi-screen layout for rendering machine
ASK_ENGINE_NIC_TYPE	0	Type of interface of sub-net network card
ASK_MMT_SECURE_MODE	0	Secure mode
ASK_GRAPHIC_ACCELERATOR_TYPE	0	Type of graphic accelerator
ASK_MX_REFRESH_RATE	0	Refresh rate of AGX / UGX GRAPHIC CARD

Table 6-16

Please, keep in mind, that an entry set to zero does not disable the respective feature. But its properties are not questioned during custom configuration.

This procedure must be carried out as described in section 6.2.1 Boot modes**.**

6.2.6 X server parameters

If you want to make changes to the graphical user interface X.11, which are not supported by the configuration tools introduced in section 3.4.2 X.11 configuration, you can manipulate the appearance and the properties of X.11 with a number of options.

On Eos there are manual pages about the `Xserver` available. For reading these man pages enter **`man Xserver`** in the command line:

```
# man Xserver
```

Additional options are listed in the table below:

`-no_cursor_on_video`	The cursor becomes invisible, as long as it is moved over videos.
`-ddc_all`	DDC detection is asked for every graphic channel. Each graphic channel needs up to 6 seconds for detection. Therefore this should not be used as a standard (Only applicable with UGX-/AGX Graphic Card), see section 4.8.2 DDC utility.
`-no_ddc`	DDC detection is not done at all.
`-DRGB_888`	All RGB sources are digitized and transferred to the OmniScaler with 24 bpp (RGB 8:8:8) instead of the default setting with 16 bpp (RGB 5:6:5). Restarting the X server without this option resets the default settings.
`-new_video_layout`	Configures in a distributed system to each video adapter its own video channel. For usage of logical video channels please refer to section 3.4.3 Configuring a distributed system and 6.2.7 Advanced Eos configuration.

Table 6-17

The desired options must be entered manually each in a single line in the file:

```
/etc/MMTconfig/MMTServerConfig
```

X Server parameters that shall not be changed at a new run of the script **EOSconfig** can be entered between the two lines:

```
# BeginSection Private
# EndSection
```

This procedure must be carried out as described in section 6.2.1 Boot modes**.**

The file MMTServerConfig contains already lines inserted automatically by the configuration script. Do not change these entries manually.

6.2.7 Advanced Eos configuration

The geometry of the rendering machines, the assignment of video and graphic channels, the REMOTE-CONTROL hot-keys and the configuration of the projection channels are defined in the configuration file:

`/etc/MMTconfig/MMTConfigSections`

This procedure must be carried out as described in section 6.2 Software installation and configuration**.**

The file `MMTConfigSections` consists of four sections: geometry, video, channels and rctrl.

geometry

This section starts with the keyword `geometry` and defines the geometry of the rendering machines, if in a distributed system multiple-logical-screens are used. This geometry section must not be changed manually, but it is configured by means of the X.11 configuration script **EOSconfig**, please refer to section 3.4.5 Configuring a distributed system with multiple logical screens. General information about multiple-logical-screens can be found in section 4.1 Multi-screen capability.

With multiple-logical-screens an individual color depth and visual class can be assigned to each screen. Multiple-logical-screens can be used in two different modes: Separate-screens or Contiguous-screens. These modes differ only in the behavior of the cursor and in the demands of the arrangement of projection cubes.

The contiguous-screens mode is used if multiple screens shall be displayed on one display wall. The screens must completely fill the rectangular array of the display wall. The cursor can be moved continuously over all screens on the whole display wall. In the geometry section the keyword `ContiguousScreens` must be written in a line. The following lines contain each a rendering-machine (`engine-x`), the module arrangement (`m×n`), the position within the display wall (`X Y`) and optional the color depth (`bpp xx`) and visual class (`cc x`). The visual class may have the values `3` (pseudo color), `4` (true color) or `5` (direct color). Please see section 4.2.2 Color capabilities of Eos for the possible color settings. All screens where not explicitly color depth and visual class is assigned use the settings of the X server configuration.

```
geometry

ContiguousScreens

engine-0  2x1  0 0  bpp 16  cc 4
engine-1  1x1  2 0  bpp 16  cc 5
engine-2  3x1  0 1
```

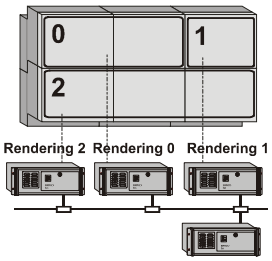


Figure 6-19
Three independent screens in contiguous mode

The separate-screens mode allows displaying multiple screens on multiple display walls and single projection modules. Nevertheless it is required, that the pixel resolution of each projection module that is used to display the different screens is identical.

To use separate-screens the keyword `SeparateScreens` must be written in a line of the geometry section. As with contiguous-screens each following line contains the information of one screen, but the position must not be indicated.

With separate-screens the cursor is first displayed on screen 0. Moving the cursor out of screen 0 to the right lets the cursor enter screen 1 on the left side. It will enter screen 1 on the same ratio of height as it has left screen 0. This can be continued until the screen with the highest number displays the cursor. Moving out to the right usually brings the cursor again on screen 0. This can be prevented by the keyword `NoCursorWrap`. This keyword can be inserted in any single line of the geometry section.

```
geometry

SeparateScreens

engine-0  4x2  bpp 16  cc 5
engine-1  1x1
engine-2  2x2
NoCursorWrap
```

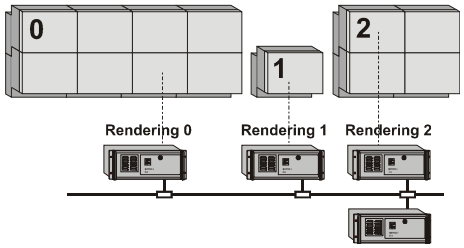


Figure 6-20
Three independent screens in separate mode

Video

This section starts with the keyword `video`. The system stores in this location the configuration of the logical video channels of a distributed system. Please refer to section 4.6.2 The video channels for a basic explanation of video channels. The video section must not be changed manually, but by means of the script **EOSconfig**, see section 3.4.3 Configuring a distributed system. The way the configuration is written in this section is identical to the way you have to specify the configuration in **EOSconfig**. Therefore you find here an instruction about it.

The syntax of the video section is as follows:

- For each rendering machine, there must be a single line starting with the rendering machine's name: e. g. **`engine-1`**.
- Within this line the video adapters of this rendering machine must be listed. The position where the entry of an adapter is located defines the corresponding video channel.
- The first position in the line corresponds with video channel 1, the second position with video channel 2 etc.
- The entries in one line are separated by a space.
- If no video adapter of that rendering machine uses a particular video channel, then a **`0`** has to be in that position.
- If multiple rendering machines have an entry for a video adapter at the same position, this means that these adapters form together a logic video channel.
- There might be blank lines and comments starting with a # character for better clarity. It is e.g. helpful to have a commented line that lists the available video channels and makes the positions for the video adapters more obvious.

You may not mix adapters of input cards of different type to one logic video channel.

Dual RGB Input Cards may not be used to set up a logic video channel.

By default the video section is empty and a standard assignment is applied, see section 4.6.2 The video channels. This standard assignment numbers the individual video adapters in the order of the PCI slots, beginning in the order of the rendering engines. This means at first the video adapters of the first rendering machine are numbered in the scanning order of the PCI slots, followed by the video adapters of the second rendering machine, etc.

With this standard assignment, a video is restricted to the display area of the rendering engine where the input card is located. Combining a video adapter of one rendering machine with a video adapter of the same type in a different rendering engine to a logical video channel allows to display the connected video source in a window that is freely movable and displayable across both display areas. A logical video channel may contain a video adapter of every rendering engine, enabling to move this video on the whole display wall.

If considering a distributed system with two rendering machines, each equipped with one QUAD ANALOG VIDEO CARD, the default configuration would correspond to an entry in the `video` section like this:

```
video
# channel: 1 2 3 4 5 6 7 8
engine-1   1 2 3 4 0 0 0 0
engine-2   0 0 0 0 1 2 3 4
```

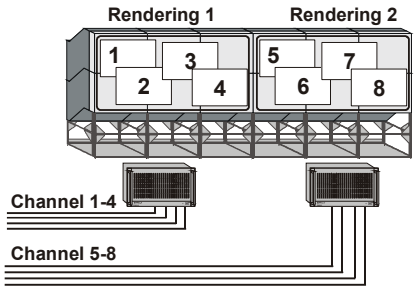


Figure 6-21

In the above example, eight different videos can be displayed simultaneously (**`channel: 1 2 3 4 5 6 7 8`**). (Note: The number of video channels is not defined in the comment line, but by the number of entries following the rendering machines' names.) Four videos can be displayed on the left part of the display wall by the four adapters of the first rendering machine (**`engine-1`**). The other videos can be displayed on the right part of the display wall by the four adapters of second rendering machine (**`engine-2`**).

A configuration of the same system that enables two logic video channels could look like this:

```
video
# channel: 1 2 3 4 5 6
engine-1   1 2 3 4 0 0
engine-2   0 0 3 4 1 2
```

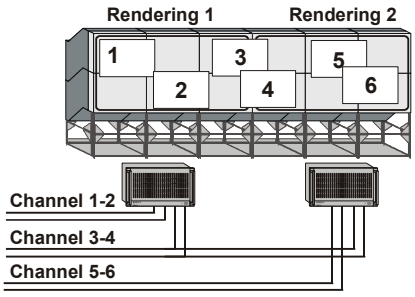


Figure 6-22

In the above example, two video channels (**`channel 3`** and **`channel 4`**) are »logic« video channels. They can be displayed and moved over the complete display wall. One logic video channel is setup with the adapters 3 of both rendering machines the other logic video channel is setup with the adapters 4 of both rendering machines. Channel **`1, 2, 5`** and **`6`** can be displayed within the left part of the display wall, respectively within the right part only.

channels

This section starts with the keyword `channels` and defines the assignment of graphic channels to projection channels. This section must not to be changed manually but by aid of the script **EOSconfig** (channel reordering), see section 3.4.2 X.11 configuration.

If this section is not existing, the standard assignment, as described in section 3.2.5 Graphic cards is effective.

The graphic channel (physical channel) is defined by the order of the graphic card and the port number. The number of the projection channel indicates the place where the data has to be displayed (logical channel). Usually graphic channel and projection channel have the same numbering (see section 3.2.5 Graphic cards, please). Anyhow depending on the configuration it might be useful to reorder the graphic channels and to connect the projection modules with the respective ports of the graphic cards. The following example should point up the operating:

An Eos together with an Eos Extender is used to display graphic and video on a 4×2 display wall. Thereby some videos shall be movable on the left part of the wall, others on the right part of the wall.

The two segments of the Eos Extender are each equipped with OmniScalers and input cards. With the standard ordering, the first four modules would be controlled by the cards in segment 1 (counted line by line, starting in the upper left corner). The cards in segment 2 would control the remaining four modules in the lower row of the wall. The video windows could only be displayed in one of these areas. The figure below shows the standard ordering. The graphic channels of segment 1 are illustrated bright, graphic channels of segment 2 are illustrated dark.

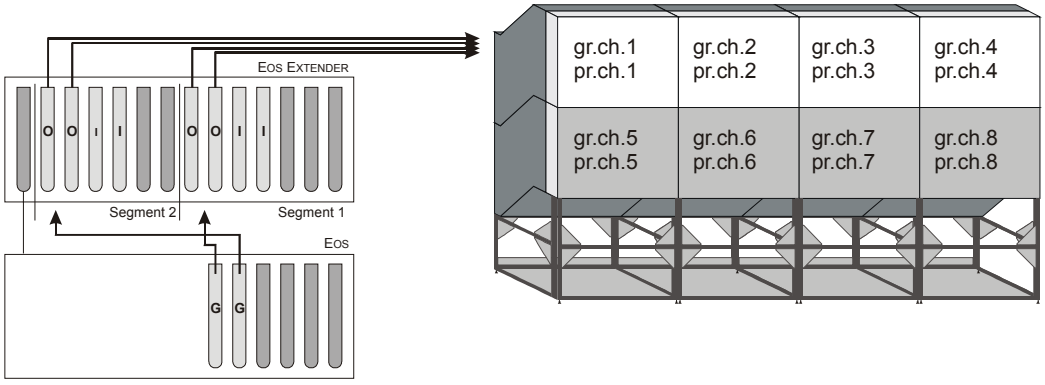


Figure 6-23
standard numbering of graphic and projection channels

And with a possible new numbering of the graphic channels, enabling to split the display wall in a left and a right side, as indicated in the figure and table below:

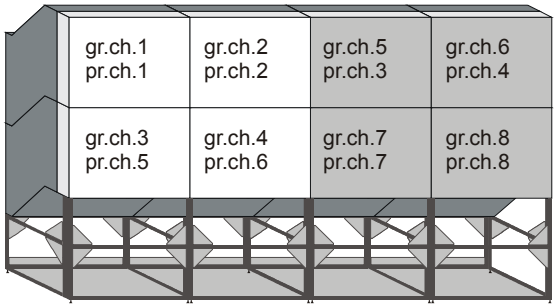


Figure 6-24
reordered numbering of graphic and projection channels

OmniScaler	1		2		3		4	
port	0	1	0	1	0	1	0	1
graphic channel	1	2	3	4	5	6	7	8
projection channel	1	2	5	6	3	4	7	8

Table 6-18
Relation between board, port, graphic channel and projection channel

The entry in the configuration file just concerns the channels that differ from the default configuration. Therefore the graphic channels 1, 2, 7 and 8 are not indicated (Port 0 of OMNISCALER 1 still displays the information of the leftmost projection cubes on the top). Graphic channel 3 (Port 0 of OMNISCALER 2) shall display the information of the leftmost projection cubes on the lower row and is therefore correlated with the projection channel 5 etc.

You may insert blank lines and comments starting with a # character for better clarity.

```
channels
# graphic channel numbers
3 4 5 6
# projection channel numbers
5 6 3 4
```

Reassigning a system with rendering machines, the name of the concerned rendering machine has to be mentioned as well.

```
channels

engine-2
# graphic channel numbers:
1 2 3 4
# projection channel numbers:
2 3 4 1

engine-3
# graphic channel numbers:
2 3 4
# projection channel numbers:
4 2 3
```

The graphic channels of the rendering machine 1 and the graphic channel 1 of the rendering machine 3 remain unchanged. It is just possible to reassign the channels within the displayed area of a rendering machine. To change size or place of the displayed area see section 3.4.3 Configuring a distributed system, please.

rctrl

This section starts with the keyword `rctrl` and defines the hot-keys for Remote-Control. If the `rctrl` section does not contain any data, Eos applies a default setting:

```
rctrl
#rctrl_enable   1
#rctrl_key_1    XK_Control_L
#rctrl_key_2    XK_Shift_L
#rctrl_host     host-name
#rctrl_port     13579
#rctrl_wall     1
#rctrl_switch   1
```

entry	argument meaning	default
`rctrl_enable`	`0 | 1` Activates/deactivates hot-keys.	`1`
`rctrl_key1`		`XK_Ctrl_L` Defines first key for hot-keys.
`rctrl_key2`		`XK_Shift_L` Defines second key for hot-keys.
`rctrl_host`	`<hostname>` Specifies hostname or IP address, where the `rctrl` daemon is started.	`local host`
`rctrl_port`	`<port>` Specifies port of the `rcrld` daemon. (Default should not be changed!)	`13579`
`rctrl_wall`	`<displayWall>` Specifies type of OverView display wall 1 OverView-mL 2 OverView-mP, Atlas67C4-PSI 3 OverView-mD	`1`
`rctrl_switcher`	`<switcherType>` Specifies type of multiplexer 1 AVC-Box, Hermes V2A, Digital Switchbox, Hermes D2D	`1`

Table 6-19

For `rctrl_key1` and `rctrl_key2` all key codes, defined within the X.11 **include file** keysymdef.h can be specified. The hot-keys for Eos are listed in section 4.7.4 Hot-keys.

6.2.8 Redundant network adapter

To obtain a redundant network connection to the LAN the central device can be equipped with multiple network cards, that form an AFT (Adapter Fault Tolerance) team. A team consists of two or more network cards of the same type. At least one of the cards must be a server adapter. The other ones can be server or desktop adapters. Nevertheless we recommend to use for a redundant network adapter exclusively server adapters to achieve an easy spare part handling. A team has an active (primary) adapter and one or more secondary adapters. The primary adapter is the network card that is used by default for data transfer. One of the secondary adapters is only used if a fault occurs that prevents data transfer via the primary adapter. Whether the primary adapter is a server adapter or not is of no importance but all cards of a team must be either exclusive 100 Mbps network cards or exclusive 1000 Mbps network cards.

Configuration of an AFT team

To form a team of network cards the script **config** can be used. Therefore log in as **root** and change to the directory **/opt/MMT2686/ians**. The factory set password for root is **barco**.

```
eos login: root
Password: barco
[root@eos root] # cd /opt/MMT2686/ians/
```

Start the script by entering **./config**:

```
[root@eos config] # ./config
```

The script will prompt you to select the network cards that are part of the team. The network cards are named **eth0**, **eth1**, etc. This numbering follows the reverse order of the PCI slots in which the cards are inserted, please refer also to section 3.2.12 Network. Nevertheless it might be more convenient to first check the names of the network cards by means of the **procfg** utility, see section 4.8.7 Network reporting utility (procfg).

Below you can read through a typical course of the configuration script expanded with comments giving more details:

```
************************************************************************
*                                                                      *
*    BARCO iANS configuration script                                   *
*    ===============================                                   *
*    The configuration process will now ask you to enter your          *
*    selection for the Intel(R) Advanced Network Services (iANS)       *
*                                                                      *
************************************************************************

Do You want to continue([Y]/n): y
```

First enter **y** to start with the configuration. In the following the script presents you a list with the available network cards. You are prompted to select the network cards that form one team. The AFT team of Eos is called **bteam0**. First enter the number of the network card that shall be the primary adapter. Anew a list is shown but without the already selected card. Enter the number of the next member of the team. When all team members are selected enter **0** to continue with the configuration.

```
Select members for team bteam0:
0. done
1. eth0
2. eth1
3. eth2
1

Select members for team bteam0:
0. done
1. eth1
2. eth2
1

Select members for team bteam0:
0. done
1. eth2
0
```

Enter the IP address and netmask for the team (virtual adapter). This is in general the same IP that was indicated in the system configuration.

```
Enter ip address for virtual adapter [192.168.1.1]: 192.168.1.1
Enter netmask for virtual adapter [255.255.255.0]: 255.255.255.0


Chosen values:
Virtual adapter members:        eth0 eth1
IP address:                     150.158.181.176
Net mask:                       255.255.254.0
Are you sure (y/n)? y


*******************************************************
*                                                     *
*    BARCO iANS Configuration completed successfully.   *
*                                                     *
*******************************************************
```

When confirming the selected values with **y** the AFT team will be configured, else you will exit the script without changes.

Revoking an AFT team

The members of an AFT team can be released as well. To achieve this log in as **root** and change to the directory **/otp/MMT2686/ians** like explained above and run the script **unconfig**:

```
[root@eos ians] # ./unconfig
```

After confirming to unconfigure the AFT team with **y**, the script revokes the team. The network cards of the team get the same IP address and netmask they had before building the team:

```
You want to continue([Y]/n): y
unconfig: ...done
```

6.2.9 Nearby color allocation

In order to ensure that X clients can allocate their colors in 8 bit PseudoColor mode even if the color map is already filled completely the Nearby Color Allocation has been implemented: If an X client requests a shared color and the X server is not able to allocate this color exactly, it decides to return a color that is »nearby« the requested one.

Nearby Color Allocation can be applied optional, whether by a command line parameter on start up of the X server (option mode) or by specifying a file with a set of predefined colors (file mode).

Option mode

Nearby Color Allocation is used if the color table is full or if there are more than a given number of colors contained in the color table. The number of colors in the color table up to that colors are allocated by exact match strategy is set by the following command line parameter:

```
-nearby <n>
```

If the color table already contains <n> colors further allocation of shared colors will be carried out using Nearby Color Allocation strategy. Values between 16 and 256 are allowed.

A certain amount of colors can be reserved as private colors for X clients that are to be started later.

File mode

The environment variable `NEARBY_FILE` specifies the name of a file that contains the definition of shared colors. The environment variable `NEARBY_FILE` is only considered if the command line parameter `–nearby` is not set. The number of entries in the file specifies the parameter <n> in that case.

If neither `–nearby` <n> nor `NEARBY_FILE` is set the X server searches for the file named `nearby` in the following directory:

```
/etc/MMTconfig/nearby.def
```

If the file `nearby.def` cannot be found color allocation will be carried out using standard-strategy that means using exact-matching-strategy.

The nearby configuration file contains in the first line the keyword `COLORCELLS` separated by a blank from the number of colors defined in the following lines, e. g.:

```
COLORCELLS 135
```

In the following lines the RGB values are defined in hexadecimal notation, separated by blanks and within a range of `0` to `0xFF`. Lines beginning with the character # are considered to be comments. E. g.:

```
# red:
FF 00 00
# green:
00 FF 00
# blue:
00 00 FF
# grey:
32 32 32
```

In file mode all specified colors are allocated as shared color cells on start up of the X server. By specifying a balanced set of colors you can avoid color distortions as they may appear in option mode if e. g. only shades of blue have been allocated and yellow is requested.

In the file `nearby.def` a maximum of 256 colors can be specified. If there is a need for private cells, only a correspondingly smaller number of colors may be defined.

6.2.10 BIOS settings for Wake On LAN

In a distributed Eos system that is delivered with X server release 3.48 or newer, the BIOS of the mainboards of the rendering machines is already configured to enable Wake On LAN (WOL). If you want to check the settings or if it is necessary to enable WOL for another reason (e.g. if you want to use the onboard LAN adapter and to remove the rendering network cards with Etherboot mechanism, please refer to section 3.2.12 Network) you can do the following provided that you have an Eos model with order number RSEOS30265 or RSEOS33272 or higher:

- Switch off the complete Eos system, please refer to section 3.3.3 Switching off, but leave the power switch [35] of the rendering processor on.

Repeat the following for all rendering machines:

- Connect a keyboard to the rendering machine
- Switch on this rendering machine by its power button [13] at the front.
- The device starts booting. On one channel of the display wall its graphical output is displayed. As soon as the system offers to enter the BIOS, press the **F2**-key.
- Within the BIOS take care that the following settings are selected:

```
Power
  Power On/Off
    LAN :                        Enabled
    Power Failure Recovery :     Previous State
```

- If using the onboard LAN adapter, check that its use is enabled in the BIOS.

```
Peripheral Configuration
  LAN Controller                 Enabled
```

- Save the BIOS settings and exit the BIOS.
- Switch off the device by its power button [13] at the front.
- Disconnect the keyboard

After configuring all rendering machines, you can switch on the whole system again, please refer to section 3.3.2 Switching on.

7 Technical appendix

This chapter provides tabular overviews about the technical details of Eos, its components and of their interfaces.

7.1 Technical data

Eos

dimensions (h/w/d)	
standard case	177mm/440mm/450mm | 6.97 in./17.32 in./17.72 in.
for redundant operation	177mm/440mm/516mm | 6.97 in./17.32 in./20.32 in.
dimensions (h/w/d) with rubber feet, fixation, handling	
standard case	183mm/482mm/500mm | 7.20 in./18.98 in./19.76 in.
for redundant operation	183mm/482mm/565mm | 7.20 in./18.98 in./22.24 in.
weight	15.7kg | 34.6lbs.
power mains	100-240V, 60Hz/50Hz
power consumption	
standard power supply	300 W
redundant power supply	400 W
operating conditions	0 .. 40° Celsius at max. 80% humidity, non condensing

Table 7-1

Eos Extender

dimensions (h/w/d)	177mm/440mm/450mm | 6.97 in./17.13 in./17.72 in.
dimensions (h/w/d) with rubber feet, fixation, handling	183mm/482mm/500mm | 7.20 in./18.98 in./19.76 in.
weight	14kg | 30.9lbs.
power mains	100-240V, 60Hz/50Hz
power consumption	400 W
operating conditions	0° .. 40° C at max. 80% humidity, non condensing
Interfaces	13 PCI slots for expansion cards 1 slot for connecting to Eos

Table 7-2

UGX Graphic Card

graphic accelerator	4×Radeon 7500 (M7-CSP32)
memory	1×64MB SDRAM
resolution & colors (analog)	8bpp, 15 bpp, 16 bpp, 24 bpp, 32 bpp
640×480	85 Hz
800×600	85 Hz
1024×768	85 Hz
1152×864	84 Hz
1280×960	85 Hz
1280×1024	85 Hz
1600×1200	85 Hz
resolution & colors (digital)	8 bpp, 15 bpp, 16 bpp, 32 bpp up to 1600×1200@60Hz
video output stage	pixel clock digital 165 MHz, pixel clock analog max. 350 MHz
bus connection	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz
supply voltage	5 V (±5%), 3.3 V (±0.3 V)
current consumption	5 V / max. 4.0 A, 3.3 V / max. 2.0 A
operating conditions	0 .. 50° C at 8% - 80% humidity, non-condensing
dimensions	PCI long card 312.00 mm × 121.92 mm with ISA retainer and front plate 352.18 mm ×121.92 mm
weight	280 g
plugs	1 64/32bit, Dual Voltage Signaling PCI edge connector 2 Dual-DVI connector

Table 7-3

AGX Graphic Card

graphic accelerator	2×RAGE MOBILITY-128 M
memory	1×64MB SDRAM
resolution & colors (analog)	8bpp, 16 bpp, 32 bpp
640×480	85 Hz
800×600	85 Hz
1024×768	85 Hz
1280×960	85 Hz
1280×1024	85 Hz
1600×1200	85 Hz
1900×1440	60 Hz
resolution & colors (digital)	8 bpp, 16 bpp, 32 bpp
640×480	61 Hz
800×600	60 Hz
800×600	72 Hz (only unscaled)
1024×768	60 Hz
1024×768	68 Hz (only unscaled)
1280×1024	60 Hz
video output stage	pixel clock digital 135 MHz, pixel clock analog max. 250 MHz
bus connection	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz
supply voltage	5 V (±5%), 3.3 V (±0.3 V)
current consumption	5 V / 0.8 A, 3.3 V / 2.5 A
operating conditions	0 .. 50° C at max. 80% humidity, non-condensing
dimensions	PCI long card, 312.00 mm × 121.92 mm with ISA retainer and front plate, 352.18 mm ×121.92 mm
weight	270 gr
plugs	1 64/32bit, 3.3V Dual Voltage Signaling PCI edge connector 1 Dual-DVI connector

Table 7-4

OmniScaler

video/RGB input format	YUV4:2:2, XRGB8:8:8:8, RGB8:8:8, RGB5:6:5
data input format	24 bpp PanelLink
data output format	24 bpp PanelLink in the resolution and timing of the input up to 1280×1024 AGX-3002 up to 1600×1200 AGX-3313
video source RAM	64 MB DDR SDRAM, 64 bit
bus connection	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz
supply voltage	5 V (±5%), 3.3 V (±5%)
current consumption	5 V / 2.5 A, 3.3 V / 0.8 A AGX-3002 5 V / 2.6 A, 3.3 V / 1.3 A AGX-3313
operating conditions	0 .. 50° C at 8% - 80% humidity, non-condensing
dimensions	PCI long card 312.00 mm × 121.92 mm with ISA retainer and front plate 352.18 mm ×121.92 mm
weight	250 gr
plugs	1 64/32bit, Dual Voltage Signaling PCI edge connector 1 Dual-DVI connector in, 1 Dual-DVI connector out

Table 7-5

Quad Analog Video Card

video-decoder	4 x Micronas VPC3230D
de-interlacer	4 x Micronas SDA9400
scaler	4 x Silicon Optix sxZX1 for 1:1 or downscaling
CPU	NEC VR5000A, 64bit MIPS Processor @ 200MHz
System Controller	NEC VRC5074, 64bit/66MHz PCI-Interface, 100MHz CPU-Bus/Memory-Interface, 2 DMA Channels
CPU-/Frame-Memory	64MB SDRAM
input formats	Y/C, FBAS PAL B,G,H,I,M,N NTSC M, N, 4.43 SECAM
colors	internal data path YUV 4:2:2 (16 bit wide)
video standard	ITU-R601 and ITU-R656 compatible
bus	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz, 3.3/5 V
power supply	5 V (±2%), 3.3 V (±0.3 V), 12 V (±10%), -12 V (±10%)
power consumption	5 V / 1.5 A, 3.3 V / 3.5 A, 12 V / 100 mA, -12 V / 100 mA
operating conditions	0 .. 50° C at 8 - 80% humidity, non-condensing
dimensions	PCI long-card, 312.00 mm x 121.92 mm
weight	425 g
connectors	1 x 64 bit, 3.3 V/5 V PCI edge connector 1 x 160pol. LFH connector

Table 7-6

Streaming Video Card

Scaler	4 x Silicon Optix sxZX1 for 1:1 or downscaling
CPU	NEC VR5000A, 64bit MIPS Processor @ 200MHz
System Controller	NEC VRC5074, 64bit/66MHz PCI-Interface, 100MHz CPU-Bus/Memory-Interface, 2 DMA Channels
CPU-/Frame-Memory	64MB SDRAM
Compression algorithm	MPEG-1 ISO 11172 MPEG-2 ISO13818 DVB ETR 154 / SPTR (the DVB format is MPEG-2 based)
Digital network carrier	Ethernet 10/100Mbps
Bitrate *1)	40Mbps MPEG-2 D1 streams with up to 12 Mbps each max. 4 streams
Video transmission protocol	UDP RTP (headers not interpreted)
connection protocols	IGMP (multicast subscription)
supported encoders	VCS, iMPath, Vbrick, NELL, Teleste, NKF, Synectics, Optibase (ASI-to-IP)
colors	internal data path YUV 4:2:2 (16 bit wide)
bus	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz, 3.3/5 V
power supply	5 V (±2%), 3.3 V (±0.3 V)
power consumption	5 V / 2.2 A, 3.3 V / 4.4 A
operating conditions	0 .. 50° C at 8 - 80% humidity, non-condensing
dimensions	PCI long-card, 312.00 mm x 121.92 mm
Weight	480 g
connectors	1 x 64 bit, 3.3 V/5 V PCI edge connector 2 × RJ45 connector 8-pin for redundant connection

Table 7-7

***1) Delivieries of the Streaming Video Card with power PC software version 1.1x do not provide full product specifications, as given above. Instead the following values apply:**

Bitrate	28 Mbps: 4 D1 streams up to 7 Mbps / stream 3 D1 streams up to 9 Mbps / stream 1 or 2 D1 streams up to 12 Mbps / stream

If you are not sure about the state of your STREAMING VIDEO CARD, please contact the Barco support, see section 8.3 Hot line!

Dual RGB Input Card

A/D converter	2 x Analog Devices AD9888	
scaler	4 x Silicon Optix sxZX1 for 1:1 or downscaling	
CPU	NEC VR5000A, 64bit MIPS Processor @ 200MHz	
System Controller	NEC VRC5074, 64bit/66MHz PCI-Interface, 100MHz CPU-Bus/Memory-Interface, 2 DMA Channels	
CPU-/Frame-Memory	64MB SDRAM	
input	Dual input mode (up to SXGA 1280×1024@75 Hz / input): Pixel clock 20 MHz – 135 MHz / input Line frequency 15 kHz – 115 kHz / input	
	Single input mode (up to 2048×1536@65 Hz): Pixel clock 20 MHz – 270 MHz Line frequency 15 kHz – 115 kHz	
	Hsync+Vsync, Csync, Sync-on-Green	
colors	15 bpp / 32K, 16 bpp / 64K, 24 bpp / 16M	
internal frame rate		
input timing:	**max. frame rate with internal color depth of 16 bpp and 24 bpp**	
	dual input mode **(also other combinations, if considering pixel clock and line frequency requirements):**	
1280x1024@60Hz and textmode@70Hz	**2 x 20Hz at 16 bpp**	**2 × 20Hz at 24 bpp**
2 x 1280x1024@60Hz	**2 x 20Hz at 16 bpp**	**2 x 20Hz at 24 bpp**
2 x 1280x1024@75Hz	**2 x 25Hz at 16 bpp**	**2 x 18Hz at 24 bpp**
	single input mode:	
1280x1024@60Hz	**60Hz at 16 bpp**	**60Hz at 24 bpp**
1280x1024@75Hz	**75Hz at 16 bpp**	**75Hz at 24 bpp**
1280x1024@85Hz	**42.5Hz at 16 bpp**	**42.5Hz at 24 bpp**
1400x1050@70Hz	**35Hz at 16 bpp**	**35Hz at 24 bpp**
1600x1200@85Hz	**42.5Hz at 16 bpp**	**42.5Hz at 24 bpp**
1920x1440@60Hz	**30Hz at 16 bpp**	**30Hz at 24 bpp**
1920x1440@75Hz	**37.5Hz at 16 bpp**	**–**
2048x1536@60Hz	**30Hz at 16 bpp**	**30Hz at 24 bpp**
2048x1536@65Hz	**32.5Hz at 16 bpp**	**–**
bus	PCI bus, 32bit / 33 MHz, 64bit / 66 MHz, 3.3/5 V	
power supply	5 V (±2%), 3.3 V (±0.3 V), -12 V (±10%)	
power consumption	5 V / 1.5 A, 3.3 V / 3.1 A, -12 V / 20 mA	
operating conditions	0 .. 50° C at 8% - 80% humidity, non-condensing	
dimensions	PCI long-card, 312.00 mm x 121.92 mm	
weight	425 g	
connectors	1 x 64 bit, 3,3/5 V PCI edge connector 2 x 15-pin SubMinD HD connector, VGA compatible	

Table 7-8

Presets of Dual RGB Input Card

Default Presets (file: **/opt/MMT2686/etc/xvideo/presets.prs**).

Presets with PRESET_TYPE=2 are used for DUAL RGB INPUT CARD with the H_POS value "Hor Sync Time" + "H Back Porc" + "H Left Border".

	PRESET_TYPE	PLL_DIVIDER	H_SIZE	V_TOT	V_SIZE	V_PERIOD	V_POS	H_POS	H_POL	V_POL	FRAME_REDUCTION	HV_Level	SOG_Level
[640x350@70Hz]	2	800	640	449	350	14285	60	137	0	1	6	128	16
[640x350@85Hz]	2	832	640	445	350	11764	63	160	0	1	6	128	16
[640x400@70Hz]	2	800	640	450	400	14285	35	137	1	1	6	128	16
[640x400@85Hz]	2	832	640	445	400	11764	44	160	1	0	6	128	16
[640x480@60Hz]	2	800	640	525	480	16666	35	144	1	1	6	128	16
[640x480@72Hz]	2	832	640	520	480	13888	31	168	1	1	6	128	16
[640x480@75Hz]	2	840	640	500	480	13333	19	184	1	1	6	128	16
[640x480@85Hz]	2	832	640	509	480	11764	28	136	1	1	6	128	16
[720x400@70Hz]	2	900	720	449	400	14285	36	154	1	0	6	128	16
[720x400@85Hz]	2	936	720	446	400	11764	45	180	1	0	6	128	16
[800x600@56Hz]	2	1024	800	625	600	17857	24	200	0	0	6	128	16
[800x600@60Hz]	2	1056	800	628	600	16666	27	216	0	0	6	128	16
[800x600@72Hz]	2	1040	800	666	600	13888	29	184	0	0	6	128	16
[800x600@75Hz]	2	1056	800	625	600	13333	24	240	0	0	6	128	16
[800x600@85Hz]	2	1048	800	631	600	11764	30	216	0	0	6	128	16
[1024x768@43Hz]	2	1264	1024	817	768	23256	24	232	0	0		128	16
[1024x768@60Hz]	2	1344	1024	806	768	16666	35	296	1	1	6	128	16
[1024x768@70Hz]	2	1328	1024	806	768	14285	35	280	1	1	6	128	16
[1024x768@75Hz]	2	1312	1024	800	768	13333	31	272	0	0	6	128	16
[1024x768@85Hz]	2	1376	1024	808	768	11764	39	304	0	0	6	128	16
[1152x864@75Hz]	2	1600	1152	900	864	13333	35	384	0	0	6	128	16
[1280x960@60Hz]	2	1800	1280	1000	960	16666	39	424	0	0	6	128	16
[1280x960@75Hz]	2	1686	1280	1000	960	13333	39	386	0	0	6	128	16
[1280x960@85Hz]	2	1728	1280	1011	960	11764	50	384	0	0	6	128	16
[1280x1024@60Hz]	2	1688	1280	1066	1024	16666	41	360	0	0	6	128	16
[1280x1024@75Hz]	2	1688	1280	1066	1024	13333	31	392	0	0	6	128	16
[1280x1024@85Hz]	2	1728	1280	1072	1024	11764	47	384	0	0	6	128	16
[1600x1200@60Hz]	2	2160	1600	1250	1200	16666	49	496	0	0	6	128	16
[1600x1200@65Hz]	2	2160	1600	1250	1200	15385	49	496	0	0		128	16
[1600x1200@70Hz]	2	2160	1600	1250	1200	14285	49	496	0	0	6	128	16
[1600x1200@75Hz]	2	2160	1600	1250	1200	13333	49	496	0	0	6	128	16
[1600x1200@85Hz]	2	2160	1600	1250	1200	11764	49	496	0	0	6	128	16

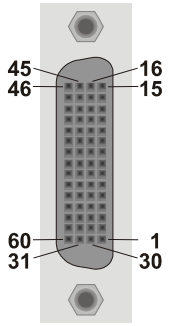
[1792x1344@60Hz]	2	2448	1792	1394	1344	16666	49	528	1	0		128	16
[1792x1344@75Hz]	2	2456	1792	1417	1344	13333	72	568	1	0	6	128	16
[1856x1392@60Hz]	2	2528	1856	1439	1392	16666	46	576	1	0	6	128	16
[1856x1392@75Hz]	2	2560	1856	1500	1392	13333	107	576	1	0	6	128	16
[1920x1440@60Hz]	2	2600	1920	1500	1440	16666	59	552	1	0	6	128	16
[1920x1440@75Hz]	2	2640	1920	1500	1440	13333	59	576	1	0	6	128	16
[2048x1536@45Hz]	2	2804	2048	1600	1536	22222	63	600	1	1	6	128	16
[2048x2048@45Hz]	2	2804	2048	2114	2047	22222	59	709	1	1	6	128	16

Table 7-9

7.2 Interfaces

Seen from outside of Eos.

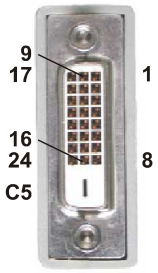
AGX Graphic Card and UGX Graphic Card



46	GND (shield, return for +5V, Hsync and Vsync)	**45**	0 - Data1+	**16**	0 - Data0+	**15**	GND
47	0 - green	**44**	0 - Data1-	**17**	0 - Data0-	**14**	0 - red
48		**43**	0 - Clock+	**18**	0 - Data2+	**13**	0 - blue
49	GND	**42**	0 - Clock-	**19**	0 - Data2-	**12**	GND
50	0 - Hsync	**41**		**20**		**11**	0 - +5V Power
51	0 - Vsync	**40**	0 - Hot Plug detect	**21**		**10**	0 - DDC clock
52	GND	**39**	0 - LED PGA	**22**		**9**	0 - DDC data
53		**38**	Scaler detect	**23**	Int Scaler	**8**	GND
54	GND	**37**	1 - LED PGA	**24**		**7**	1 - DDC data
55	1 - Vsync	**36**	1 - Hot Plug detect	**25**		**6**	1 - DDC clock
56	1 - Hsync	**35**		**26**		**5**	1 - +5V Power
57	GND	**34**	1 - Clock-	**27**	1 - Data2-	**4**	GND
58		**33**	1 - Clock+	**28**	1 - Data2+	**3**	1 - blue
59	1 - green	**32**	1 - Data1-	**29**	1 - Data0-	**2**	1 - red
60	GND	**31**	1 - Data1+	**30**	1 - Data0+	**1**	GND

Figure 7-1
Dual-DVI connector digital/analog out

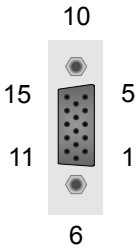
Dual-DVI to 2xDVI-D adapter cable



17	Data0-	**9**	Data1-	**1**	Data2-
18	Data0+	**10**	Data1+	**2**	Data2+
19	Data0 Shield	**11**	Data1 Shield	**3**	Data2 Shield
20		**12**		**4**	
21		**13**		**5**	
22	Clock Shield	**14**	+5V Power	**6**	DDC Clock
23	Clock+	**15**	Ground (return for +5V)	**7**	DDC Data
24	Clock-	**16**	Hot Plug Detect	**8**	
		C5			

Figure 7-2
DVI-D connector

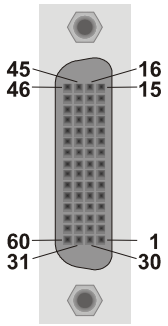
Dual-DVI to 2xCRT adapter cable



1	red	**6**	red GND	**11**	
2	green	**7**	green GND	**12**	DDC data
3	blue	**8**	blue GND	**13**	Hsync
4		**9**	+5V Power	**14**	Vsync
5	GND	**10**	GND	**15**	DDC clock

Figure 7-3

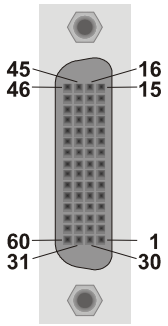
OmniScaler digital in



46	GND (shield, return for +5V)	**45**	1 - Data1+	**16**	1 - Data0+	**15**	GND
47		**44**	1 - Data1-	**17**	1 - Data0-	**14**	
48		**43**	1 - Clock+	**18**	1 - Data2+	**13**	
49	GND	**42**	1 - Clock-	**19**	1 - Data2-	**12**	GND
50		**41**		**20**		**11**	
51		**40**	1 - Hot Plug detect	**21**		**10**	1 - DDC clock
52	GND	**39**	1 - LED PGA	**22**		**9**	1 - DDC data
53		**38**	Scaler detect	**23**	Int Scaler	**8**	GND
54	GND	**37**	0 - LED PGA	**24**		**7**	0 - DDC data
55		**36**	0 - Hot Plug detect	**25**		**6**	0 - DDC clock
56		**35**		**26**		**5**	
57	GND	**34**	0 - Clock-	**27**	0 - Data2-	**4**	GND
58		**33**	0 - Clock+	**28**	0 - Data2+	**3**	
59		**32**	0 - Data1-	**29**	0 - Data0-	**2**	
60	GND	**31**	0 - Data1+	**30**	0 - Data0+	**1**	GND

Table 7-10
Dual-DVI connector digital in

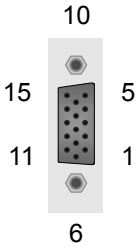
OmniScaler digital out



46	GND (shield, return for +5V, Hsync and Vsync)	**45**	0 - Data1+	**16**	0 - Data0+	**15**	GND
47		**44**	0 - Data1-	**17**	0 - Data0-	**14**	
48		**43**	0 - Clock+	**18**	0 - Data2+	**13**	
49	GND	**42**	0 - Clock-	**19**	0 - Data2-	**12**	GND
50		**41**		**20**		**11**	0 - +5V Power
51		**40**	0 - Hot Plug detect	**21**		**10**	0 - DDC clock
52	GND	**39**	0 - LED PGA	**22**		**9**	0 - DDC data
53		**38**	Scaler detect	**23**	Int Scaler	**8**	GND
54	GND	**37**	1 - LED PGA	**24**		**7**	1 - DDC data
55		**36**	1 - Hot Plug detect	**25**		**6**	1 - DDC clock
56		**35**		**26**		**5**	1 - +5V Power
57	GND	**34**	1 - Clock-	**27**	1 - Data2-	**4**	GND
58		**33**	1 - Clock+	**28**	1 - Data2+	**3**	
59		**32**	1 - Data1-	**29**	1 - Data0-	**2**	
60	GND	**31**	1 - Data1+	**30**	1 - Data0+	**1**	GND

Figure 7-4
Dual-DVI connector digital out

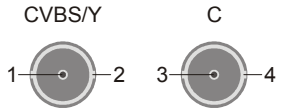
VGA-Card and onboard VGA adapter



1	red	**6**	red GND	**11**	
2	green	**7**	green GND	**12**	
3	blue	**8**	blue GND	**13**	Hsync
4		**9**		**14**	Vsync
5		**10**	sync GND	**15**	

Figure 7-5

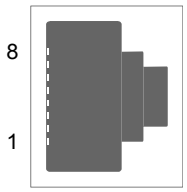
Quad Analog Video Card Breakout Cable



	CVBS/Y		C	
	1	2	3	4
S-Video	Y	GND	C	GND
Composite	FBAS	GND	not connected	not connected
channel 1	CVBS/Y 1 (blue wire)		C1 (grey wire)	
channel 2	CVBS/Y 2 (black wire)		C2 (purple wire)	
channel 3	CVBS/Y 3 (red wire)		C3 (orange wire)	
channel 4	CVBS/Y 4 (yellow wire)		C4 (green wire)	

Figure 7-6
(Colors of the wires might differ, please use the label on the wire for identification.)

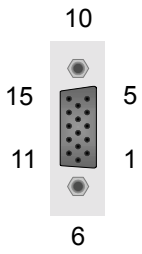
Streaming Video Card



1	TD+	5	
2	TD-	6	RD-
3	RD+	7	
4		8	

Figure 7-7
RJ-45 connector, Streaming video card

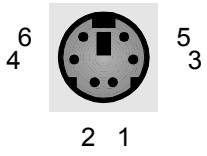
Dual RGB Input Card In



1	red	6	red GND	11	
2	green	7	green GND	12	
3	blue	8	blue GND	13	H/C SYNC
4		9		14	VSYNC
5	sync GND	10	sync GND	15	

Figure 7-8

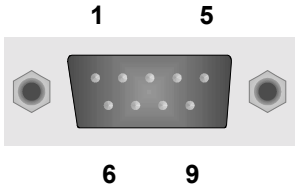
PS/2 keyboard



1	data	**4**	+5V
2		**5**	clock
3	GND	**6**	

Figure 7-9

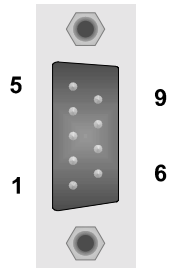
COM1 and COM2



1	DCD	**6**	DSR
2	RxD	**7**	RTS
3	TxD	**8**	CTS
4	DTR	**9**	RI
5	GND		

Figure 7-10

Multiport I/O Card

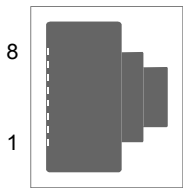


1	DCD	**6**	DSR
2	RxD	**7**	RTS
3	TxD	**8**	CTS
4	DTR	**9**	RI
5	GND		

Figure 7-11
serial connector pin assignment

Network card and onboard LAN adapter

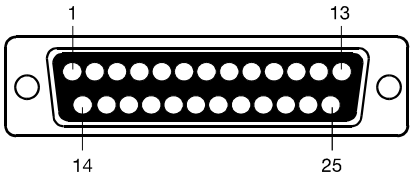
For complete cabling details, please refer to the **IEEE802.3** specification, section 8.4, **Coaxial Cables and Electrical Parameters**.



1	TX+	**5**	
2	TX–	**6**	RX–
3	RX+	**7**	
4		**8**	

Figure 7-12
RJ-45 connector pin assignments

Connection cable (keyboard extension)



Plug 1	twisted pairs	Plug 2
1	1 and 14	**1**
2	2 and 15	**2**
3	3 and 16	**3**
	etc.	
13	–	**13**
	etc.	
23	23 and 10	**23**
24	24 and 11	**24**
25	25 and 12	**25**
Shield connected to plug housing Ferrit		Shield connected to plug housing Ferrit

Figure 7-13

7.3 Order codes

Documentation	
RSDOC30612	user's manual Eos X Terminal, English
R5976214	user's manual Visu^{Plus}, English
R5976144	user's manual Osiris, English
Hardware	
RSEOS30264	Eos base unit, 19 In., standard
RSEOS33271	Eos base unit, 19 In., with redundant power supply
RSEOS31930	Eos Extender, 13 slots, 19 In., standard
RSEOS31931	Eos Extender, 13 slots, 19 In., with redundant power supply
RSDRV33490	hard drive in removable frame; order options (please indicate): **X.11,** **preinstalled operating system (X server)** **Eos, english** **user's manual Eos X Terminal, English**
RSDRV33100	RAID 1 controller, including 2 hard drives, order options (please indicate): **X.11,** **preinstalled operating system (X server)** **Eos, english** **user's manual Eos X Terminal, English**
RSDRV33540	RAID 5 controller, including 3 hard drives, order options: **X.11,** **preinstalled operating system (X server)** **Eos, english** **user's manual Eos X Terminal, English**
RSMMT27330	CD-ROM drive for software upgrades
RSDRV33560	DVD-ROM drive for software upgrades
RSAGX32811	UGX Graphic Card with DVI-D adapter cable, digital **AGX-3281-0**: UGX Graphic Card for Eos, Dual-DVI connector, 4 channels **CBL-3242-0**: Dual-DVI to 2xDVI-D adapter cable
RSAGX32812	UGX Graphic Card with CRT adapter cable, analog **AGX-3281-0**: UGX Graphic Card for Eos, Dual-DVI connector, 4 channels **CBL-3243-0**: Dual-DVI to 2xCRT adapter cable
RSAGX33131	OmniScaler with Dual-DVI cable, digital **AGX-3313-0**: OmniScaler, Dual-DVI connector, 2 channels **CBL-3264-0**: Dual-DVI to Dual-DVI cable
RSMPG33450	Streaming Video Card
RSFRG32920	Quad Analog Video Card with video breakout cable 8×BNC **RSCBL33520**
RSRGB32930	Dual RGB Input Card
RSNET27920	Ethernet card 10/100 Mbps
RSNET27923	Ethernet card 10/100 Mbps, server for redundancy
RSNET32830	Ethernet card 10/100/1000 Mbps
RSNET32832	Ethernet card 10/100/1000 Mbps, rendering
RSNET32833	Ethernet card 10/100/1000 Mbps, server
RSMMT27340	VGA-Card for central device
RSEOS30521	Multiport-I/O card, PCI
RSTAS32320	Logitech PS/2 optical mouse, 2.5m cable
RSWST23664	Keyboard, MF-II English
RSNET28261	Gigabit Ethernet Switch, 8 ports
RSTAS27470	PC-keyboard/mouse extension TAS-2706-1: Interface box PC TAS-2707-1: Interface box keyboard/mouse TAS-2710-0: Connection cable 20m TAS-2711-1: Connection cable PC

Spares	
	for **RSEOS30264**, **RSEOS33270, RSEOS33271**:
RSMEM32133	memory 256MB DDR RAM-DIMM
RSMEM32134	memory 512MB DDR RAM-DIMM
	for **RSEOS30265**, **RSEOS33272, RSEOS33273**:
RSMEM32135	memory 256MB DDR RAM-DIMM
RSMEM32136	memory 512MB DDR RAM-DIMM
RSPSU32840	redundant power supply for Eos **RSEOS3327** or Eos Extender **RSEOS3193**
RSDRV33499	Spare hard drive in removable frame without operating system
RSDRV33109	Spare hard drive for RAID 1 in removable frame without operating system
RSDRV33549	Spare hard drive for RAID 5 in removable frame without operating system
RSEOS31040	Dust filter for Eos base unit
RSEOS31041	Dust filter for Eos Extender
Cables and adapters	
	Remote-Control
RSGBP26050	cable, 9 m
RSGBP26051	cable, 0,2 m
RSGBP26052	cable, 3,5 m
RSGBP26053	cable, 5 m
RSGBP26060	shortening plug
	graphical data
RSGBP27120	MDR26 <–> MDR26, max. XGA, 6 m
RSGBP27122	MDR26 <–> MDR26, max. XGA, 2 m
RSGBP27123	MDR26 <–> MDR26, max. XGA, 10 m
RSGBP27124	MDR26 <–> MDR26, max. XGA, 1,5 m
RSCBL31360	DVI-D –> MDR26, max. XGA, 1,5 m
RSCBL31361	DVI-D –> MDR26, max. XGA, 2 m
RSCBL31362	DVI-D –> MDR26, max. XGA, 10 m
RSCBL31890	MDR26 –> DVI-D, max. XGA, 1,5 m
RSCBL31891	MDR26 –> DVI-D, max. XGA, 2 m
RSCBL31892	MDR26 –> DVI-D, max. XGA, 10 m
RSCBL32060	DVI-D <–> DVI-D, max. SXGA, 2 m
RSCBL32062	DVI-D <–> DVI-D, max. XGA, 5 m
RSCBL32040	DVI-D –> DVI-D optical, max. SXGA, 10 m
RSCBL32041	DVI-D –> DVI-D optical, max. SXGA, 20 m
RSCBL32042	DVI-D –> DVI-D optical, max. SXGA, 50 m
RSCBL32420	Dual-DVI –> 2xDVI-D adapter cable
RSCBL32430	Dual-DVI –> 2xCRT adapter cable
RSCBL32450	Dual-DVI <–> Dual-DVI cable
RSCBL32030	MDR26 –> DVI-D adapter
RSCBL32050	DVI-D –> MDR26 adapter
RSCBL31900	DVI-A –> VGA adapter
Software	
RSOVT26861	CD-ROM Medium: Eos software
RSOVT26867	CD-ROM medium: documentation and supplement Eos
RSEOS30701	Eos base license X.11
RSEOS30702	Eos central device license
RSEOS30703	Eos rendering device license
RSLIC32912	driver license per graphic channel of UGX Graphic Card

Table 7-11

8 Troubleshooting

Check this chapter for help, if your Eos does not boot properly and for information how to contact the technical support of Barco.

8.1 Eos not booting

When Eos is not booting properly it is important to state at which point of the boot process a fault occurs. The display while booting is as follows, so you can see where the process is stopped.

On the first display (**board 1**/**port 0**, see section 3.2.5 Graphic cards), respectively on the central unit's VGA monitor:

```
S3 Mobile PCI VGA BIOS 3.02
Copyright (C) 1996 S3 Incorporated

S3 M5 On Board
OVT BIOS FMW-2882-03 14.08.2000

Interface Typ: 2 ---> digital
Scan PCI Bus for OVT-2882
PCI->PCI bridges found: 2
Dev Bus Slot
=== === ====
0      2      0    init...   PhysBase: $DC000000  done  PGA
1      2      1    init...   PhysBase: $D8000000  done
```

The ordinary self test report of a PC is displayed.

The other displays show their respective bus and slot no., e. g.:

```
S3 Mobile PCI VGA BIOS 3.02
Copyright (C) 1996 S3 Incorporated

S3 M5 On Board
OVT BIOS FMW-2882-03 14.08.2000

Interface Typ: 2 ---> digital

HEX Switch   :  4 --> 1024 * 768    Light-Engine (XGA)
```

fault	**cause/steps**

boot process is aborted while
`Dev Bus Slot`
`=== === ====`
`0 2 0 init...`
`↳ PhysBase: $DC000000 done PGA`
`1 2 1 init...`
`↳ PhysBase: $D8000000 done`
is displayed.
	There is probably a problem with the graphic cards. Make sure of all graphic cards are inserted correctly. Refer to section 6.1.3 Inserting an additional expansion card, please.
	If the fault remains, contact Barco, please.

boot process is aborted `CMOS checksum error` appears on the display	The battery is empty. Replace it by a fresh one. Please, refer to section 5.2.2 Replacing the battery.
boot process is aborted, `This PC has no hard disk or hard disk is unreadable. SYSTEM HALTED` appears on the display	Contact Barco, please.

Table 8-1

8.2 Eos does not boot from CD

Check if booting from CD is enabled in the mainboard BIOS setup. CD needs to have higher booting order than the hard drive.

8.3 Hot line

Feel free to contact us if you have any further questions!

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  Phone: +32-56-368-211, Fax: +32-56-368-251
  E-mail: support.bcd@barco.com, Web: www.barcocontrolrooms.com

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